



This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

### Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

- + *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.
- + *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.
- + *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.
- + *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

### About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at <http://books.google.com/>

# DAVOS PLATZ AS AN ALPINE WINTER STATION

FOR CONSUMPTIVE PATIENTS

BY J. E. MUDDOCK



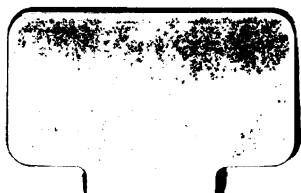
WITH SCIENTIFIC NOTES ON THE AIR  
THE FOOD AND THE WATER

BY PHILIP HOLLAND F.R.S.

Price in England, . . . . . 3s. 6d.  
Price on the Continent, . . . . . 5 Francs.





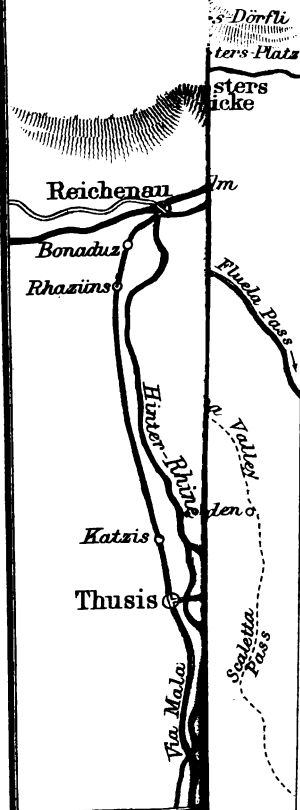




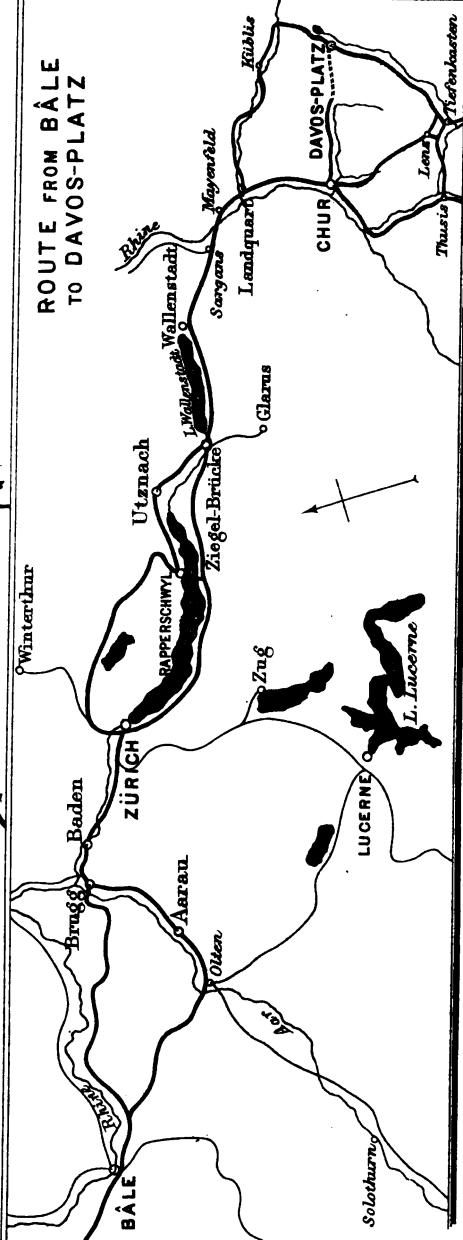


# DAVOS SURROUND

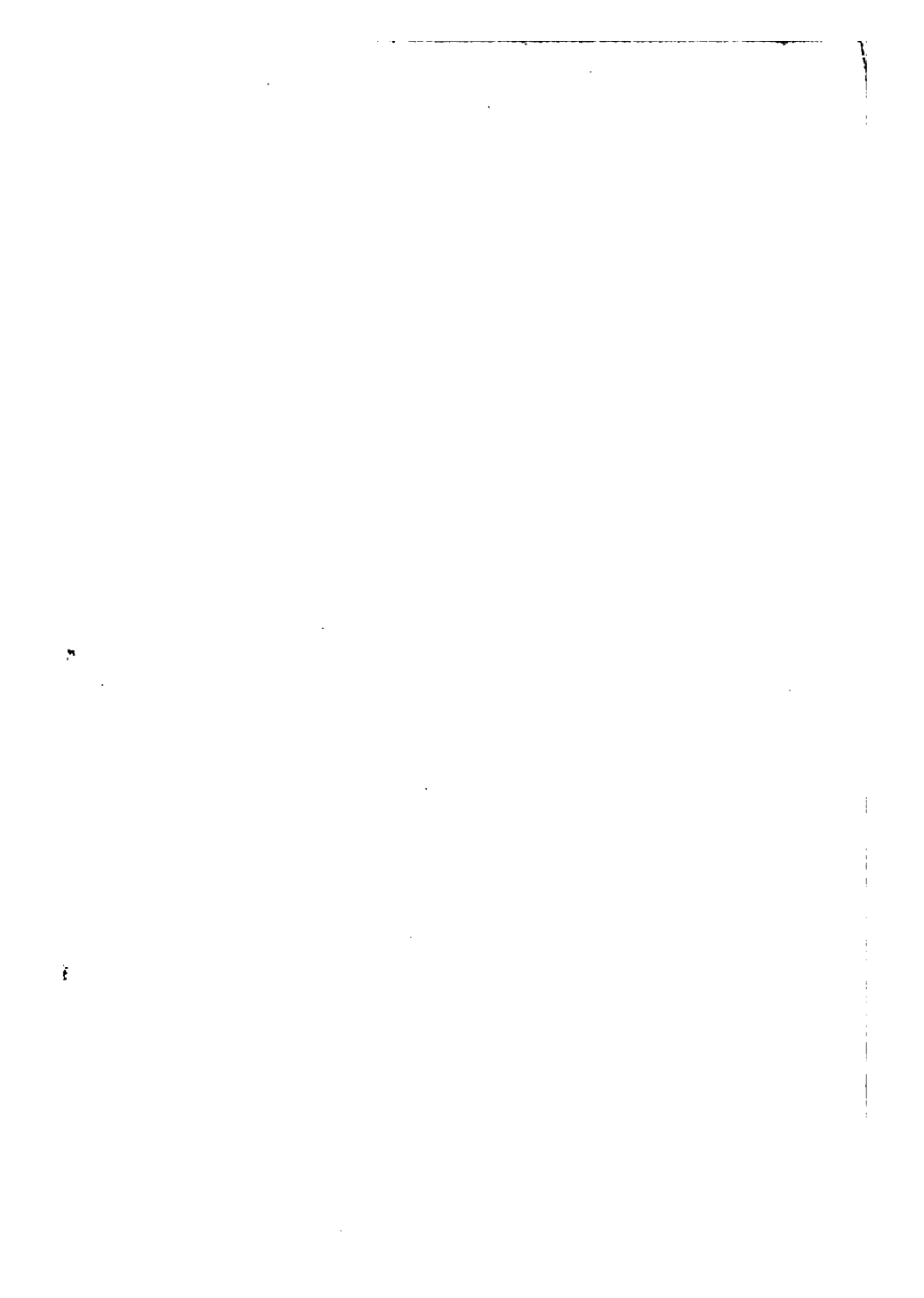
1 2 3 Km  
 1 2 3 Eng  
 Railway.  
 Diligence



## ROUTE FROM BÂLE TO DAVOS-PLATZ









DAVOS - PLATZ,

*A Summer View  
Looking N.E. from above the Church.*

# DAVOS-PLATZ

AS AN

ALPINE WINTER STATION.

FOR

CONSUMPTIVE PATIENTS

BY

J. E. MUDDOCK,

AUTHOR OF "A WINGLESS ANGEL," "AS THE SHADOWS FALL," &C.

WITH

*ANALYTICAL NOTES ON THE FOOD, AIR,  
WATER, AND CLIMATE,*

By PHILIP HOLLAND,

*Analytical Chemist and Fellow of the Chemical Society.*

LONDON:

SIMPKIN, MARSHALL, & Co.,  
STATIONERS' HALL COURT.

PARIS:

THE GALIGNANI LIBRARY,  
224, RUE DE RIVOLI.

MDCCCLXXXI.

Price in England, 3s 6d; on the Continent, 5 Francs.



151. o. 586.

PRINTED IN THE "FIFE HERALD" AND "FIFE NEWS" OFFICE, CUPAR.

## P R E F A C E .

---

IN offering this little work to the public, the Editor takes leave to say that he has used every care to make it a reliable and valuable authority on one of the most important health stations of the present day. In testing the air, we have availed ourselves of Dr Angus Smith's system known as "Washing," and the Editor has reason to believe that this is the first time the method has ever been applied to the air of a popular health resort. Dr Smith does not claim infallibility for his test. It, however, affords a good criterion of the air's freedom or otherwise from those organic impurities, which are supposed to be in some way closely related to diseases of a zymotic character.

The analyses of the food and water, samples of which were collected by the Editor and his colleague last winter, have been carefully made by Mr Philip Holland, of Manchester, a Fellow of the Chemical Society, and public analyst for the Borough of Southport. His figures may be accepted as accurate in every detail, and can scarcely fail to prove valuable to the medical profession and scientific men, as well as to the general public.

To Mr and Mrs Macmorland, of Davos-Platz, the Editor is indebted for the meteorological tables, and he hereby begs to tender his thanks to that lady and gentleman for the able assistance they so readily rendered him. Mr and Mrs Macmorland have made observations for a number of years with instruments tested at Kew, and these observations have always been conducted with a scrupulous regard for accuracy.

Having no interests to serve in Davos, the Editor has been uninfluenced by any personal considerations. The want of a reliable work on the valley was generally acknowledged by all who knew the place, and he has endeavoured to conscientiously supply that want, and in a brief and intelligible way to give every information that can possibly be desired by the intending visitor.

In conclusion, he begs to say that he has written without fear or favour. His duty was to the Public. To it alone he is responsible, and in its interest he has not shrunk from speaking plainly where plain speaking was necessary. Whether he has succeeded in performing his task satisfactorily or not is for the Public to decide.

## NOTICE.

---

The editor begs to state that he will be glad to notice in a future edition any *bona fide* complaints about mismanagement or extortions in hotels, shops, &c.; or to receive suggestions that may be of use to visitors.

In every case real name and address must be given as a guarantee of good faith.

All letters should be addressed—

EDITOR,

“DAVOS PLATZ,”

Care of SIMPKIN, MARSHALL, & Co.,

PUBLISHERS,

L O N D O N .



# I N D E X.

---

|                                                     | PAGE |
|-----------------------------------------------------|------|
| General Description, - - - - -                      | I    |
| Hotels, - - - - -                                   | 13   |
| The Air of Davos, - - - - -                         | 20   |
| The Water of Davos, - - - - -                       | 28   |
| Milk, - - - - -                                     | 34   |
| Butter, - - - - -                                   | 38   |
| Beers, - - - - -                                    | 40   |
| How to Reach Davos and what to Wear, - - -          | 46   |
| Over the Alps in Winter, - - - - -                  | 49   |
| The Alps in Winter, - - - - -                       | 66   |
| Meteorological Observations, - - - - -              | 78   |
| Comparative Weather Table of Pau in the Pyrenees, - | 90   |
| Excursions, - - - - -                               | 93   |
| Amusements, - - - - -                               | 94   |
| Dietary Scale, - - - - -                            | 96   |
| Memoranda, - - - - -                                | 98   |
| Thermometer Tables, - - - - -                       | 101  |
| Vocabulary, - - - - -                               | 102  |
| Hotels and Pensions at Davos, - - - - -             | 107  |
| Notice to Advertisers, - - - - -                    | 108  |
| Advertisements, - - - - -                           | 109  |



# DAVOS-PLATZ

AS A

## WINTER ALPINE STATION

FOR

## CONSUMPTIVE PATIENTS.

---

### GENERAL DESCRIPTION.

To many persons into whose hands this little work may fall, Davos Platz will be a veritable *terra incognita*, and, therefore, it is the author's aim to give in a succinct and reliable form such information as will be valuable from a therapeutic as well as a popular point of view.

Less than a quarter of a century ago, if any medical man had suggested a high Alpine region as a winter residence for chest patients, the strong probabilities are that he would not only have brought himself into disrepute in the medical world, but would have incurred the ridicule of the general public. Even now the profession is divided against itself on the question of a northern or southern climate being most fitting in lung-mischief; for doctors are proverbially conservative, and slow to countenance any new idea or scheme or experiment that has not been thoroughly tested by thoughtful study and practical experience. In the interest of humanity this reluctance to hastily accept new theories, or try new

places, is to be commended, though very frequently there is a blind clinging to old forms of faith, and an illogical prejudice against innovations, even though they promise great things. To go to this place or that, whether in search of health or on pleasure bent, is as much governed by fashion's laws as is the cut of a coat or the shape of a bonnet; and he is a bold man who undertakes, for the first time, to lead the vast family of human sheep to a new health resort or pleasure ground. Madeira, the Riviera, the South of France, and the Cape of Good Hope have had their day; but long experience has proved that each place, while good in its way, does little more in a large number of cases than slightly arrest the rapidity of the disease, and at the most offer sufferers a genial climate in which to end their fast-fleeting days. What has been eagerly searched for, and what is desired, is a climate possessing certain atmospheric conditions, which, acting upon the wonderfully delicate respiratory organs, will not only arrest decay, but possess healing qualities that are capable of restoring the tone of the broken down lung tissue so far as to enable it to perform the functions allotted to it by Nature.

We therefore propose to examine carefully, and in detail, the claims of Davos Platz to be considered a place of this description; taking the opportunity to state that we have qualified ourselves for the work by a careful study of the climate, and by scientific observations, the results of which will be given in their proper place.

Davos stands in an Alpine valley, and according to Doctor Frankland's measurements is as near as possible 5352 feet above sea level—that is, roughly speaking, about one thousand feet higher than the highest point of Great Britain, which is Ben Nevis in Scotland. The valley is situated in eastern Switzerland, in Canton Grisons; and runs

almost parallel with the Engadine, the nearest point of which is nineteen miles away.

Sixteen years ago Davos was a primitive Alpine hamlet, almost entirely unknown to the general public, and like all Alpine villages was not conspicuous for its perfect sanitary arrangements, or the cleanliness of its inhabitants. About that time, however, the region attracted the attention of a German doctor, who was struck by the fact that the natives enjoyed an immunity from lung disease, and were in other respects generally healthy. It therefore occurred to him that owing to the almost entire absence of moisture and wind in the winter, together with the remarkably pure air, it was admirably adapted as a winter residence for chest patients, notwithstanding its Arctic temperature. The result of his investigations was that he commenced to send his patients into the valley with good effect, and the want of accommodation was soon supplied by an enterprising Dutchman, who appeared upon the scene and erected an hotel.

The reputation of the place gradually spread to Italy, and many Italians, leaving their own beautiful country, came over the passes to that lonely valley, where they passed the winter months; and in the spring they returned to their homes greatly benefited by their sojourn in this region of snow and ice.

By some unaccountable means, Davos does not seem to have attracted any serious attention in England until between four and five years ago, although Germans and Italians had flocked to the place by thousands, and there was pretty conclusive evidence of the beneficial effects of a winter residence there. When once attention in England was aroused, quite a rush of English visitors took place, and now there seems to be a danger that mischief may arise owing to the want of discrimination in the class of patients

who are most likely to experience the good effects of the fine climate. As a natural consequence of this influx of visitors, the once obscure hamlet has developed into an important village of grand hotels, pensions, and excellent shops, where almost every necessary and luxury may be purchased at a less cost than in Paris.

So far as the mere physical features of Davos go, it will not bear comparison with dozens of other Alpine valleys in point of beauty; but out of Switzerland it would be difficult to select a spot that should equal it in all particulars; so that when not contrasted with other Swiss scenery, it is very beautiful indeed.

The valley, which is from ten to fifteen miles long, runs from N.N.E. to S.S.W. Its floor is of unequal level, and slopes more gently to the south than to the north. Its average breadth is not more than half-a mile, and it is protected on each side by vast mountain ranges, which rise for the most part precipitously to between 2000 and 5000 feet above the floor of the valley, consequently between 10,000 and 11,000 above sea level. These ranges are pierced by several passes, gorges, and lateral valleys, chief of the passes on the east side being the Flüela, which is a post and telegraph road and the highway into the Lower Engadine and the Val Tellina.\* Of this pass we shall speak further on. Nearer Davos, and running parallel with the Flüela, is the Dischma Thal, which is nearly ten miles in length, and is closed at its upper end by the Scaletta glacier. To the north of Davos, distance about three-quarters of a mile, is the village of Davos-Dörfli, admirably situated and well provided with hotels, and possessing the advantage of being sunnier than Davos itself. Further still is Wolfgang or

---

\* Locally, but incorrectly, pronounced Veltina.

Davoser Kulm, the highest point of the valley, which falls away precipitously from here to Klöstern, and is the post route to Landquart. In the barrier of mountains which separates the Flüela from the Dischma Thal is the rugged glacier—covered Schwarzhorn, 10,338 feet, from the summit of which a wonderful view is obtained that is unsurpassed in Switzerland. Dominating Davos on the east side is the Jacob's Horn, and the big and little Schiahorn on the west side; while the south end of the valley is shut in by a magnificent range of jagged peaks, including the tooth-like Tinzenhorn—which is a miniature Matterhorn, and nearly as difficult to ascend—the Piz Michel, and the Piz D' Aela, each of which is covered with perpetual snow. An impetuous torrent called the Landwasser—which rises from the Davoser see (lake) and is fed by streams from the Dischma, Sertig, and other Thals—flows through the valley; tears its way along a wonderful gorge known as the Züge—frequently swept by tremendous avalanches in the spring—and joins the Hinter Rhine (which rises in the Splügen) at Thusis.

In summer Davos is a little world of marvellous colours, for no greener grass grows anywhere; while the flora is perhaps richer, more varied, and profuse than in any other valley of the same height. It has the advantage of never being insufferably hot, and as a starting point for many interesting mountain and glacier excursions it is admirably situated; while the neighbourhood abounds in exquisite walks through romantic gorges and pine forests. It is, however, with Davos under its winter aspect that we now have to deal.

The first fall of snow takes place, generally speaking, about the beginning of November. The previous day, in all probability, has been brilliantly fine, and the sun may have

set in a glory of gold and scarlet ; but when the Davosians turn out on the following morning they find their valley robed in dazzling white, which will remain so, under ordinary circumstances, for nearly five months. If the first snowfall is very heavy the natives say it presages a good winter ; and "very heavy," may be taken to mean three to four feet on the ground at once, and a "good winter" a very cold, dry, and hard one. Throughout November, and very frequently far into December, the weather continues more or less unsettled, and snow falls at intervals or incessantly until the villages and mountains are thickly covered. It consolidates on the road to three or four feet in thickness, so that all wheeled vehicles are changed for sledges. About the end of December, in favourable years, settled weather may be looked for, and Nature in Davos falls into its long winter sleep. The conditions now are perfectly still air, intense cold, absolute dryness, and absence of wind and fog. These conditions, however, are not always to be relied upon, as will be hereafter shown. During the winter months the cattle are all housed in the chalets ; the forests are frozen into stony stillness ; and there is not the cry of the tiniest animal or the chirp of a bird to break the silence, though the track of foxes—and on very rare occasions, indeed, that of a bear—may be seen in the snow.\* The water courses are all frozen into solid ice, and the Landwasser chafes its way between piled-up masses of ice, that in many places entirely bridge it. At night the thermometer will frequently sink below zero, the stars shine with unsurpassed brilliancy, and when the moon is high Davos presents a picture of cold silvery-white beauty that can never be forgotten. The days are cloudless, the colour of the sky an intense lapis lazuli, and

---

\* Two bears were shot near Davos during the winter of 1879.

the sun so brilliant and hot that umbrellas and awnings are indispensable, and the most delicate invalid may during the sunny hours sit in the open air with impunity. As soon as the sun sinks, however, there is an *instant* change in temperature, often as great as fifty and sixty degrees, but before this every delicate person has sought the shelter and warmth of the house. The houses are specially built to resist the intense cold, and are provided with double windows and doors, and have stoves in the passages and public rooms.

It will be understood that no one who is delicate will venture out after nightfall, though it is astonishing how little the cold is felt, comparatively speaking. This is the result, of course, of a dry atmosphere and an absence of wind. As a piece of curious evidence of this dry state of the atmosphere, it may be mentioned that the breath from human beings and animals does not become visible vapour as it would do if the climate were damp. These exceptional conditions secure for Davos a salubrity which few other health resorts can boast of. But in addition to this the air possesses singular tonic qualities, and is highly ozonised by the volatile properties of the pines, which, as is well known, are valuable therapeutic agents, whilst its purity is fully borne out by the series of experiments we have made on the air, the results of which are given further on.

From the facts above mentioned, it would seem that Davos answers all the requirements of a sanative health resort for delicate lungs :—First, on account of its dryness ; secondly, its purity and freedom from irritating germs ; and thirdly, because it possesses tonic properties in a high degree.

The favourable effect upon the patient is that his cough grows less troublesome, hæmorrhage is arrested, the breathing becomes freer, and there is a well-defined sense of general

improvement. But perhaps the most marked and encouraging feature is the increased appetite, and consequently increase of weight.

It will, of course, be understood that we refer particularly to those patients who are in a condition to be benefited by such an entire and thorough change as removal to Davos must necessarily produce; but as we shall endeavour to show later on, this change may be, and is in a large number of cases, decidedly injurious and calculated to accelerate the end which everyone is so anxious to stave off. The patient must be in a state favourable to the new and exacting conditions which the climate imposes, and if he is not, then he will very soon find himself running down instead of going up. Many persons who cannot stand mountain air would find themselves improved by a sojourn on the sea line, and *vice versa*; and which of the two should be selected is a question that only a skilled medical man is competent to decide; but even a doctor may be seriously at fault in this matter in the absence of reliable data bearing on the place to which he proposes to send his patient. If the winter climate of Davos were not liable to alterations—that is, if it invariably presented *all* the features we have referred to—it would be safe to say that it would be pre-eminently the one place where invalids, suffering from lung mischief, might hope for an amelioration of their worst symptoms, if not for absolute recovery. Unfortunately, however, the climate is—as all climates are—liable to marked alterations. To instance the two winter seasons of 1879-80 and 1880-81. The first will be remembered as perhaps one of the most perfect ever known in the Alps. There was during many weeks an entire absence of wind; the air was dry and tonic in a singular degree, and with one or two brief breaks the sky was absolutely unclouded, and the sun brilliant

for three months. As a natural consequence there were a great number of rapid improvements, and not a few recoveries that might not inaptly be described as wonderful. The following season, however—that is, last year—this order of things was reversed, and Davos Platz proved that it could be as capricious and fickle as our own damp and misty islands. The snowfall did not set in until late, and then it was singularly light, while a high temperature, and fogs and wind, were the rule and not the exception. Those people who derived any real benefit were in a very small minority, while the death-rate amongst the visitors rose to an alarming extent. It is fair to say, however, that this sort of weather was as unusual as it was exceptionally bad. On the other hand, it would be manifestly dishonest to assert that fogs, winds, and dampness are foreign to Davos; for anyone who will take the trouble to study the meteorological tables, extending over a number of years, will find that there are very few seasons, indeed, when these atmospheric conditions have been entirely absent. Still, if an average is taken it will be observed that the climate preserves a singular uniformity, and it is this uniformity which places it in the front rank of sanatoria.

The Föhn, or south west wind, is most to be dreaded. It is warm and moist, and exercises a very depressing effect on those who are in the least degree sensitive. It begets lassitude and weariness, brings on headache, and causes hæmorrhage to return, and where the complaint is very far advanced death may ensue. Except in very bad seasons, however, such as the one referred to above, the Föhn is not a frequent visitor, and fortunately does not last long. It is during the Föhn that avalanches are most liable to fall, owing to the warm air softening the snow.

As soon as the sun rises and shines well in the valley,

exercise, for those who can bear it, may be freely indulged in. The snow is never affected by the sun, but remains hard and firm; for although the sun's rays are intensely hot, the temperature of the atmosphere is as intensely cold, and this is what may be described as perfect "Davos Weather." At such times the sky will be perfectly cloudless, and intensely blue. The exquisite beauty of these sort of days could scarcely be realised by word painting. To the patient they are invaluable, while even in the sound they beget a sense of enjoyment of life that is simply delightful.

It may be roughly stated that during the winter months—and given an average season—a patient can remain in the open air at least seven hours a-day; and the advantage of this will be readily understood even by those who have little or no knowledge of the laws which govern lung complaints; an advantage that is greatly exalted when the air is perfectly pure, crisp, and tonic. Even at night, notwithstanding the lowness of the temperature, patients are frequently recommended to sleep with the windows of their bedrooms open. Another fact, which speaks volumes for the climate, is the little liability on the part of visitors to take cold. This immunity from a common annoyance is no doubt ascribable to the tonic properties as well as the dryness of the air.

Amongst the advantages which this beautiful mountain valley offers to the invalid, absolutely pure water is not the least of them; therefore it may be inferred that all the requirements of a curative resort come near to being absolutely fulfilled. So far as Nature is concerned this is the case, and had man done his part as well as he ought to have done, Davos might have defied competition. Unfortunately, however, there are many weak points which cannot be glossed over. Perhaps the most serious is the want of efficient

drainage. The habits of Swiss peasants do not by any means recommend themselves to English tastes. Your Swiss seems to have a supreme contempt for all sanitary matters, and an innate love for filth. Summer tourists will often have noticed this when travelling through the country. It would be thought, however, that those interested in the welfare of Davos, and who have enriched themselves, or hope to do so, by the strangers who flock there, would have been more anxious to make the place as near perfection as possible. Of the drainage we feel bound to say that it is about as bad as it can be; while heaps of offal, cow-dung from the cow chalets, and other indescribable filth, are allowed to lie exposed near the road, thereby not only offending the sight but the smell, as well as tainting the atmosphere. It is true that during the intensely cold winter months, the low temperature and the snow prevent ill effects from this disgraceful sanitary neglect; but the evil is there nevertheless, and it makes itself manifest in more ways than one as soon as any appreciable rise in the thermometer takes place. After this the reader will not be surprised to learn that typhoid and other fevers, if rare, are no strangers to the valley, and therefore Dr Frankland's remarks on typhoid, which we quote further on, have an especial interest.

It occurs to us that another serious drawback is the heating of the hotels. This is effected by the objectionable and cumbersome German stoves, at the cost of comfort and true economy. It is well known that these stoves rapidly deprive the air of its moisture, and render a room stuffy and suffocating. Hence it follows that patients complain of faintness, headaches, and other disagreeable sensations. In the interests of many thousands of sick people who resort to Davos in the fond hope of staying the hand of the fell disease that is slaying them, these stoves should be abandoned to the limbo of effete

things, and some other system introduced ; for it follows as a natural consequence that the good effects of several hours in the pure balmy atmosphere of the outside air must be neutralised if a patient passes his evenings in a stuffy, uncomfortable room, in which the air has been rendered too relaxing for diseased lungs. Open grates would, of course, be preferable ; but it is urged against them that as wood must necessarily be burnt, owing to the difficulty in obtaining coal, sufficient heat would not be diffused. We are not prepared to say that this is not true, but we would mention that as stoves are used in all the bedrooms, and as patients have to pay for their own fuel—and pay pretty dearly, too—the consumption of fuel is enormous, and yields a handsome profit to the landlords. Apart from the hygienic properties of the open grate, its cheerful influences ought strongly to recommend it, where the comfort of delicate and sickly people is of the first consideration. Where stoves are used we would suggest that a bowl of water be placed on the top, as the slow evaporation of the water would tend to keep the air from becoming too dry.



## HOTELS.

As regards the accommodation, much might be written under this head. There are many houses, good, bad, and indifferent. At the end of the work we append a complete list of the hotels and pensions, with the charges of each as far as we have been able to obtain them. The principal German hotel is the Kurhaus; the principal English ones, the Belvedere, the Buol, and the Angleterre. The Kurhaus is kept by a most enterprising Dutch gentleman, Herr Holsböer. The house is large, admirably furnished, and has excellent accommodation, while the table is good. In connection with this hotel there are several villa dependencies, which can be hired by families requiring privacy. We believe, however, that the prices range high. The Kurhaus is warmed throughout by means of steam pipes, a slightly more objectionable method than the stoves, and it does not stand well in respect to position.

The Rhätia is also a good hotel, and is frequented by English people. The table is said to be excellent, but the ventilation of the house is about as bad as it can be.

Last year a new private pension, known as the Bergadler, was opened by Herr Pestalozzi and his wife. Madame Pestalozzi is an English lady, manages the house herself, and devotes all her time and attention to her patrons. The cooking is exceptionally good, and the table capital. The Bergadler may be deservedly recommended to any one requiring home comforts.

The Buol is a fair house, and almost entirely patronized by English people. Herr Buol is, we believe, a German.

The Belvedere—kept by Herr J. C. Coester, himself an invalid—claims to be the first hotel. We are not prepared altogether to allow this claim, although we gladly testify to the admirable manner in which the house is conducted; while in the person of Siemen, the head waiter, it has the advantage of one of the most gentlemanly and obliging waiters we have ever had the good fortune to meet. It has recently been enlarged and greatly improved, and is now capable of accommodating about one hundred persons. It lacks baths, however, and the porcelain stoves destroy many of the advantages which it might otherwise have boasted over its rivals. Its position is perhaps one of the best, and the drainage of the house has been carefully attended to. It is sufficiently far removed from the town to be free from bad smells. Of Herr Coester personally we can speak in terms of unqualified praise. He understands English perfectly, and exercises the utmost care to ensure the comfort of the visitors. The Belvedere boasts the possession of an English billiard table, the *only* one possibly in Switzerland.

The Angleterre is situated further still from the village, stands isolated, and in one of the sunniest positions. The proprietor is Herr Carl Demmer, and he and his wife speak and understand English thoroughly. Herr Carl Demmer only came into possession of the Angleterre last year. Madame Demmer is a well educated lady, and has earned a reputation for extreme kindness and personal attention to visitors. Of the excellence of the table too much cannot be said. An extensive acquaintance with hotels on all parts of the Continent enables us to say that the table d'hôte of the Angleterre is certainly not excelled, if equalled, by any hotel in Europe, taking into consideration the disad-

vantages experienced in the way of procuring supplies for Davos. Since he became proprietor, Herr Demmer has effected many and important changes in the Angleterre, and it is now one of the best and most comfortable houses in the valley. It is patronised entirely by English people.

As regards the charges for pensions, &c., all the hotel circulars are misleading. They invariably contain the tempting bait of "Pension from 5s 6d per day, according to room." Five-and-sixpence a-day generally means a garret or equally objectionable place. Of course, the *extras* are not mentioned. These "tot" up to a pretty respectable sum. They include lights, service, fuel, and kurtax. Milk is charged for at the rate of about three-halfpence per glass in the hotels. All mineral waters are dear, and for the most part bad. The Val Tellina wines, which should be cheap, are high in price. The whisky, which is rubbish, is charged for at the rate of seven francs per bottle. English beers are excessively high, while good champagne is exorbitant. In addition, you are pestered to contribute to the "Church Fund," "The Nurses Fund," to funds for Christmas trees, funds for Christmas boxes to servants (who expect in the bargain to be well feed when you leave). In fact one's stay is frequently rendered irksome by the incessant appeals to "shell out" for something or another.

English Church service is at present held in the Hotel Belvedere, but the "Continental Church Society" are desirous of building a church, and for the past few years English visitors have been bled pretty freely for contributions to this "Church Fund." When the Church is built, we predict that it will prove a not unmixed blessing.

There is yet one *extra* which all the hotel circulars preserve a solemn reticence about, but which cannot be too widely known. We refer to the charge that is made to the relatives,

of a deceased person for the *bed and bedding* upon which the death takes place. As much as a *thousand francs* are charged in some of the hotels, while, we believe, three hundred francs is the minimum price. We have heard it argued that if the subject were mentioned in the circulars, it would be calculated to frighten sensitive people. It seems to us that the argument is silly and illogical, and we maintain that as long as the tax is imposed, it ought to be known what will have to be paid in the event of death. Of course, in the case of wealthy people it does not much matter, but all the people who go to Davos are not wealthy, and their resources are often seriously taxed to get there and remain when they reach their destination, so that the relatives of any one who may happen to die are generally startled and distressed when, amongst other items, *twelve to forty pounds* are demanded for bed and bedding. It is but fair to say that this *extra* is not peculiar to Davos. It is charged in most Continental health resorts, and we know of one place in Switzerland where *forty pounds* is the minimum price. As to whether the charge is fair or not we offer no opinion. What we complain about is that the matter is kept so secret. It is only *after* the death that the bereaved relatives are made aware of their liability.

Another objectionable feature is the strong desire that exists on the part of the local medical men and others financially interested in the place to suppress the number of deaths that annually occur, in order to give a false impression as to the marvellous powers of the climate to delay death. In fact, we do not hesitate to say that in not a few cases patients who were known to be hopelessly ill have been hurried elsewhere by order of the medical men, for no other reason than that the Davos death-rate might be kept low. We anticipate that this statement will lay us open to criti-

cism, if it does not beget flat contradiction ; but, fortunately, we are in possession of the most reliable data to prove what we have written.

Of medical men there are a large number, but the English practice is almost entirely monopolised by one gentleman, who, we believe, is a native of Switzerland. A good and skilled English doctor is greatly needed, but he would have to be prepared to encounter much organised opposition, and it would be necessary for him to take the Swiss degree before he could practice. This degree, we understand, can be obtained after about a three months' course at Zurich, Geneva, or Berne. Zurich, however, might present certain difficulties as it is too near Davos. *Verb sap.*

As regards the class of patients who should resort to Davos, that is a question we can scarcely presume to discuss ; but close observation justifies us in saying that it is not suited to *all* consumptive invalids, and there are some cases that it would be decidedly wrong to send there. In a large majority of chest and throat complaints good results may be hoped for from a winter residence in the valley ; but it is evident, even to the non-medical mind, that persons suffering from very advanced consumption, and where the strength has been so impaired that the patient is helpless, are not the cases for Davos, as the powerfully tonic air demands that there should be some recuperative energy left in the subject upon which it has to act ; and without this energy the very opposite effect to that looked for will certainly be the result. Such unfortunate people had better await the inevitable end in the comfort of their own homes, where they can have the care and consolation of their friends. One other question which demands very serious consideration is, How long should a patient remain in the valley ? In the course of March, in average seasons, the

winter gives evident signs of breaking up ; and by the end of the month the melting of the snow commences, and continues through April and part of May. This period is said to be unhealthy ; but we have met many people who have remained through it without feeling any ill effects. At present it is the fashion for every one to depart at the beginning of March, and some of the invalids even go sooner ; and where they should go to causes no little anxiety to those who are responsible for their welfare. Baden Baden has frequently been selected, but they might as well be sent straight to their graves at once. The change from the high Alpine region to the low, humid, and relaxing German town is too great and sudden, and has a tendency to undo all that Davos has done. Montreaux, on Lake Geneva, is recommended, and some medical men, whose opinions we have solicited, speak very favourably of this place. We have also high medical authority for saying that a sea voyage after Davos may in a large number of cases be attended with the happiest results. It will be understood, however, that under no circumstances should a patient go to Davos without having first consulted a medical man at home ; and when the break up of the winter in the valley necessitates a departure, the place to go to ought to be decided by the doctor who sent the patient there, and not by the local doctor. If this rule were rigidly followed there would be less cause of complaint than at present.

Besides hotels and pensions, Davos possesses many good shops, and all sorts of luxuries and necessities may be purchased. Clothes, boots, and shoes, however, are bad, and ridiculously high.

Herr Steffen is the leading and only reliable chemist. All drugs sold by him are good and reasonable, and nearly every

kind of English patent medicine may be obtained at his shop.

Two miles from Davos, on the Chur route, is the hamlet of Frauenkirch. The hotel Zür Post here, kept by Herr Brauger, is small but exceedingly comfortable, and infinitely cheaper than the houses in Davos. Frauenkirch possesses many advantages, and tact and enterprise ought to make it a strong rival to Davos itself.



## THE AIR OF DAVOS.

The question of the quality, density, or rarity of the atmosphere is always the first thing to be considered in connection with an invalid resort. Knowing the importance and interest attaching to this subject, we have made a special study of the Davos air, to the quality of which, in an eminent degree, the place is indebted for its fame. The following scientific data will, we feel sure, interest our readers :—

The chemical composition of the atmosphere in which we live shows it to consist in round numbers of 21 volumes of oxygen to 79 of nitrogen, together with aqueous vapour. A small and slightly varying amount of carbonic acid, traces of ammoniacal salts, nitric acid, and a substance termed ozone. What chemical or physical methods of research reveal beyond them are looked upon as foreign to it.

An important physical property of air, and one conducing largely to the well-being of both animal and plant life, is the moisture-retaining quality. Air holds aqueous vapour between its particles much as a sponge does water. It can, however, only retain a fixed quantity, dependent on its temperature at the time. When all the interstices supposed to exist between its molecules are so charged with vapour that the least fall in temperature causes the previously invisible vapour to appear as mist, the air is saturated, whilst the temperature at which this mist is seen is called the "*dew point.*"

The lower the temperature of the air the closer does it contract, and in so doing squeezes out some of the moisture it previously held.

A high temperature, on the other hand, promotes expansion, by which the vapour-retaining power is augmented, and it is to this latter property in a great measure that warm and expanded air is indebted for its ability to remove moisture from wet surfaces over which it passes.

The vapour capacity of air for different temperatures, and under a normal barometric pressure of 30 inches has been experimentally ascertained. For instance, the standard volume of air, viz., a cubic foot holds—

|            |     |     |                       |
|------------|-----|-----|-----------------------|
| At 30° F., | ... | ... | Moisture, 2·0 grains. |
| At 40° F., | ... | ... | „ 2·86 „              |
| At 50° F., | ... | ... | „ 4·10 „              |
| At 60° F., | ... | ... | „ 5·77 „              |
| At 70° F., | ... | ... | „ 8·01 „              |

These numbers represent the weight of *invisible vapour* which the standard volume can hold in suspension at the above temperature. When humidity of the air is spoken of, the term is a relative one, and is used to express comparative wetness or dryness. Taking the number 100 as the term for complete saturation, any degree of wetness can be expressed as a percentage by dividing the weight of vapour actually found by the weight which would have been found had the air been saturated. The factors for such calculations are obtained from the readings of “dry” and “wet bulb” thermometers so exposed as to be out of the reach of solar or terrestrial heat.

At Davos, when we collected our samples of air for analysis, the temperature on one occasion was 35° F., and the humidity 54 per cent., which, by calculation, gives 1·34 grains, as the weight of water per cubic foot. This was on a bright clear

day early in February, and the air still. A standard barometer registered 629.5m.m. Two principal causes operate to make the valley of Davos warm—namely, an absence of moist wind, coupled with the accession of temperature the air receives by the sun's rays reflected from the snow, as well as the direct ones.

Passing to the other gaseous component of the atmosphere—viz., the carbonic acid—its amount is not uniform for all places and seasons, though the variation is not very considerable, and is affected chiefly by meteorological and other circumstances. With a low temperature it is said to be slightly higher than at other times, whilst the nearness of large surfaces of water to the place of observation influences the quantity. Dr Thorpe, in a communication to the Chemical Society, has shown sea air to be less rich in this constituent than that on land. His number is 3 volumes per 10,000 of air, whilst a mean of many observations by other experimenters gives 4.04 volumes for that of land air. The air of hilly districts in Scotland appears, from Dr Angus Smith's researches,\* to contain 3.36 volumes per 10,000. In towns, where coal is burnt, there is more carbonic acid than in country districts, since this gas is a large constituent of burnt fuel. The air of Glasgow containing, for example, 5.02, and London 4.39. Animal respiration must be a factor also. So far as we know, a little carbonic acid in the air is not injurious, but it is otherwise when the amount is large, and 384.0 parts per 10,000 has been proved to be highly prejudicial to health, producing faintness and other symptoms. We see, then, why ill ventilated rooms do harm, not so much to the robust, however, as to the weak and ailing, whose vitality having been previously lowered by

---

\* "Air and Rain," Longmans.

sickness are on that account less fitted to withstand impure air.

We may mention in passing that air in motion transports pollen and seeds of plants to suitable soils, and, as instance, showing the power of the air to distribute, we are informed that sand and some forms of diatoms have been met with on the snow at Davos, supposed to have been brought thither from the dry and exposed tracts of the African Continent. As these are found after the snowfall in the winter, their origin cannot be local.

Probably not a single specimen of air could be collected entirely free from motes unless special means were taken to exclude them. Such a refinement is possible by filtration through wool. Air, too, after long repose, is found to deposit its floating matter. In this state Dr Tyndall calls it *optically* pure, since it can no longer scatter rays of light. It is this scattering of the rays of light by dust which makes the track of the former visible. In a general sense, then, mountain air will be purer than that of the plains unless some local cause renders it less so. Modern speculation on what is hurtful to mankind concerns itself especially with the microscopic and unweighable, with those "germs of things latent in the air," spoken of by Bishop Berkeley as the "sources of corruption and generation."

Recent discoveries show that most, if not all, air contains matter known as "Free" and "Albumenoid" ammonia, which, being given off by animal substances in a state of decay, is evidence of impurity. It therefore follows that by an examination of the air of different localities, we can compare their degrees of cleanliness. A method of this kind has been in use some years for potable water. Mr Alfred Wanklyn put it in a good and workable shape for the purpose, whilst Dr Angus Smith laid it much under contribution

in his researches on the air of towns, and was the first to do so.

By a plan of washing a known volume of air with pure water, Dr Smith obtained some highly interesting and important data. Country air he found freer from ammonia than that in towns. Moreover, that town air is not the same in all parts, but that gradations of cleanliness are perceptible which depend on the openness or closeness of a situation, its proximity to middens, offal heaps, and the like.

Taking "albumenoid ammonia," as a criterion, whereby to gauge contamination of a particular kind, it is reasonable to expect a less amount in the air of mountainous districts than in that of plains, since these must for obvious reasons be more in the abodes where mankind, in the aggregate, seeks his means of life and daily occupation. The experiments we were able to make at Davos show a rather higher reading for "Free Ammonia" than was expected, though this may be accounted for by the stillness of the air, and that what small amount of smoke there is lies longer in the valley than it would do in a more exposed situation. The figures are given just as they were obtained, but it must be remembered the ammonia process does not lay claim to a high degree of accuracy, and had we been able to increase the number of our experiments, the "mean" readings would, no doubt, have been considerably less. The information it affords is of such a kind as will enable us to make a comparison between different localities, and will tell us in which locality the air is best.

A stoppered bottle was used for washing the air with pure water. Its capacity was ascertained by calibration, corrections being made for the air's temperature and pressure at the times of the washing. Approximately the capacity was a tenth of a cubic foot. A portable aspirator served to remove the washed air and allow fresh to enter. The air

was changed a hundred times, so that about ten cubic feet were taken for each experiment.

| No. of Expt. | Where Obtained.                                                                                                                                    | Free Ammonia.<br>Grains per<br>Million Cubic<br>Feet of Air. | Albumenoid<br>Ammonia.<br>Grains per Million<br>Cubic Feet of Air. |
|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|--------------------------------------------------------------------|
| 1.           | On an exposed mountain side, some few hundred feet higher than Davos, and three miles distant, to S.W. Wind slight N.E.                            | 16.046                                                       | 29.183                                                             |
| 2.           | Same place a week later. Wind N.E. Air current slight.                                                                                             | 22.501                                                       | 26.955.                                                            |
| 3.           | Same place on following day.                                                                                                                       | 20.650                                                       | 27.342                                                             |
| 4.           | In main street and open places from Büöl Hotel to Post Office, including district from Strela Hotel to Berg-adler. Air still.                      | 58.139                                                       | 24.730                                                             |
| *5.          | Do.                                                                                                                                                | 30.519                                                       | 27.955                                                             |
| 6.           | Do.                                                                                                                                                | 31.410                                                       | 49.229                                                             |
| 7.           | Do.                                                                                                                                                | 38.092                                                       | 53.684                                                             |
| 8.           | Do.                                                                                                                                                | 33.637                                                       | 51.456                                                             |
| 9.           | Do.                                                                                                                                                | 26.955                                                       | 31.410                                                             |
| 10.          | Near Land-wasser and skating rink, including neighbourhood of stables and gas works; an odour was perceptible, and there was mist along the river. | 66.674                                                       | 69.770                                                             |

\* Air for expts. 5, 6, 7, 8, 9, were collected at various times during the winter.

| No. of Expt. | Where Obtained.                                                                                                                                     | Free Ammonia.<br>Grains per<br>Million Cubic<br>Feet of Air. | Albumenoid<br>Ammonia.<br>Grains per Million<br>Cubic Feet of Air. |
|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|--------------------------------------------------------------------|
| 11.          | Do.<br>Day very clear, and cold, ice crystals were seen in the wash water, when the bottle was at rest a few moments.                               | 62'593                                                       | 67'048                                                             |
| 12.          | Half the total quantity was washed in a close spot near the Rathhaus. A slaughter house was distant 30 yards. The remainder was taken as in No. 10. | 68'607                                                       | 67'939                                                             |

## SUMMARY OF RESULTS.

|                               | Free Ammonia.<br>Grains per<br>Million Cubic<br>Feet.    | Albumenoid<br>Ammonia.<br>Grains per Million<br>Cubic Feet. |
|-------------------------------|----------------------------------------------------------|-------------------------------------------------------------|
| Mountain sides, ... ..        | 16'046<br>22'501<br>20'650                               | 29'183<br>26'955<br>27'342                                  |
| Mean, ... ..                  | 19'732                                                   | 27'826                                                      |
| Streets and other places, ... | 58'139<br>30'519<br>31'410<br>38'092<br>33'637<br>26'955 | 24'730<br>27'955<br>49'229<br>53'684<br>51'456<br>31'410    |
| Mean, ... ..                  | 36'458                                                   | 39'744                                                      |
| Close and other places, ...   | 66'674<br>62'593<br>68'607                               | 69'770<br>67'048<br>67'939                                  |
| Mean, ... ..                  | 65'958                                                   | 68'252                                                      |

The following figures are taken from "Air and Rain," not

so much for purposes of close comparison with ours, which would be unfair, since Dr Smith's relate exclusively to town air, but to show how competent is the ammonia method to distinguish between air which is pure, air of good quality, and unquestionably bad air. By bad air we mean bad in that it associates with what is hurtful, and not merely that it offends the sense of smell. When it does so we feel we are in doubtful company, and chemical analysis would soon confirm our suspicions :—

| Air Obtained from                                | Number of Experiments Made. | Free Ammonia.<br>Grains per Million Cubic Feet. | Albumenoid Ammonia.<br>Grains per Million Cubic Feet. |
|--------------------------------------------------|-----------------------------|-------------------------------------------------|-------------------------------------------------------|
|                                                  |                             | Average.                                        | Average.                                              |
| London, ... ..                                   | 18                          | 26·780                                          | 65·947                                                |
| Glasgow, ... ..                                  | 4                           | 34·169                                          | 133·264                                               |
| A bedrom, ... ..                                 | 3                           | 44·305                                          | 104·118                                               |
| Inside and outside office,<br>Manchester, ... .. | 10                          | 53·582                                          | 116·544                                               |
| Underground railway<br>(Metropolitan), ... ..    | 2                           | 31·561                                          | 163·167                                               |
| A midden, ... ..                                 | 3                           | 146·911                                         | 181·524                                               |

From Dr Angus Smith's figures the reader will see that the air of London is pure as compared with Glasgow, which probably has the worst air in the Kingdom. Our own tables in reference to Davos go to prove the justness of our strictures on the want of sanitary attention; for we may venture to assert that whatever impurity there is in the Davos air it is due entirely to the refuse and contaminating excreta from the shippens which are allowed to lie about on and near the road. In the interest, therefore, of the place we would strongly recommend the local authorities to make it a finable offence to throw offal or other decaying matter down near the highway, or, in fact, within half-a-mile of the village.

### THE WATER OF DAVOS.

It is difficult to decide whether pure air or pure water is of the first importance in a health resort, and it may truly be said of some places, only too largely frequented, there is "water, water everywhere, but not a drop to drink." Fortunately, we are able to speak favourably of Davos as regards its water also. The belief that typhoid fever is communicable through the agency of water, though now widely accepted, is one but of recent date. Numerous cases are on record where an outbreak has been distinctly traced to a contamination of the household supply by sewer gas. A notable example of the way in which the zymotic matter can be distributed and sown by running water occurred at the village of Lausen, near Bâle, in Switzerland, when a large proportion of its inhabitants were smitten with typhoid. The particulars of this case are so pregnant with interest that we take the liberty of transcribing verbatim Dr Frankland's account of it which appeared in the pages of the journal of the Chemical Society, vol. 29.

He says—"In this healthy village (Lausen) which had "never within the memory of man been visited by epidemic "typhoid, and in which even a single sporadic case had not "occurred for many years, there broke out, in August 1872, "an epidemic which simultaneously attacked a large proportion of the inhabitants. About a mile south of Lausen, "and separated from it by the mountainous ridge of the

“Stockhalden, lies a small parallel valley—the Fürlerthal. “In an isolated farmhouse situated in this valley, a farmer “who had just returned from a long journey was attacked “by typhoid fever on the 10th of June. During the next “two months three other cases occurred in the same house, “viz., a girl, who was attacked on the 10th of July, and the “farmer’s wife and their son, who sickened in August. The “inhabitants of Lausen were entirely ignorant of what had “occurred at this solitary mountain farm, cut off as it was “from all communication with the rest of the world. On “the 7th of August ten of the villagers were suddenly struck “down by typhoid fever, whilst during the next nine days “the number of cases had already increased to 57, out of a “population of 780 persons living in 90 houses. In the “first four weeks the number of cases had reached 100 (or “above 12 per cent. of the population); and altogether to “the close of the epidemic, at the end of October, 130 (or “17 per cent. of the population) were attacked, besides 14 “children who were infected at Lausen during their summer “holidays, and became ill on their return to schools in other “localities.

“The fever cases were pretty evenly distributed through- “out the entire village; but those houses, six in number, “which were supplied with water from their own private “wells, and not from the public fountains, were entirely “exempt. This remarkable difference naturally led to a “suspicion that the public water supply was connected with “the cause of the epidemic, although the apparently immac- “ulate source of this supply seemed to negative any such “suspicion. The water came from a spring situated at the “foot of the adjacent Stockhalden ridge. It was there “received in a tank lined with brickwork, and carefully “protected from pollution; nevertheless, a careful investiga-

"tion into the source of this spring placed beyond all doubt  
"the origin of the infection.

"Ten years previously it had been proved that direct  
"water communication through the intervening mountain  
"existed between the spring and a brook in the Frlerthal  
"flowing past the farmhouse in which the typhoid cases  
"occurred. At that time there was spontaneously formed,  
"by the giving way of the soil at a short distance below the  
"farmhouse and close to the brook, a hole about 8 feet deep  
"and 3 feet in diameter, at the bottom of which a moderate  
"stream of clear water was observed to be flowing. As an  
"experiment, the whole of the brook water was diverted into  
"this hole, at the bottom of which it entirely disappeared,  
"but in an hour or two the spring at Lausen, at that time  
"nearly dry from a long drought, overflowed with any  
"abundance of water, which was turbid at first but afterwards  
"clear; and this continued until the Frler brook  
"was again confined to its bed. It was, however, afterwards  
"noticed that whenever the meadows below this hole were  
"irrigated with the water of the Frler brook, the volume of  
"the Lausen water supply became greatly augmented a few  
"hours afterwards. Now this irrigation practised every  
"year was carried on in the year of the epidemic from the  
"middle to the end of July—the brook being polluted by  
"the dejections of the typhoid patients; for it was in direct  
"communication with the closets and dungheaps of the  
"infected house, whilst all the chamber slops were emptied  
"directly into it and the dirty linen of the patients washed in it.

"Soon after the irrigation had begun the water supplied  
"to Lausen was at first turbid, acquired an unpleasant taste,  
"and increased in volume. About three weeks after the  
"commencement of the irrigation, the sudden outburst of  
"typhoid fever in Lausen occurred."

Dr Hägler, of Bâle, who investigated the cause of this eruption, and the way in which the complaint had been spread, was able, by several well executed experiments, to adduce still further evidence of the existence of a direct communication between the Fürler brook and the water supplying the public fountain in Lausen. We shall not describe them, but refer those interested to Dr Frankland's account given in his memoir "on the analysis of potable waters," *loc cit.*

The outbreak of fever at Lausen is very instructive. We have first the importation and planting of the germinal matter by the farmer in his own person in his native home-stead ; next, evidence of its seed-like character, judging from the manner in which the members of the farmer's family became affected ; lastly, there is the conveyance of the zymotic matter by water carriage to an entirely fresh area wherein those fell victims to typhoid, and those only, who had the misfortune to drink of the water. There is here a chain of events rivetted together in a firm logical sequence, the value of which as evidence that typhoid may be sown in the human body with as great certainty of a crop as when wheat is sown in a field must be clear, we think, to every one.

One of the chief objects of an analysis of water for dietetic purposes, therefore, must be to detect in it such impurities as are calculated to spread disease. The ammonia process is useful for this purpose, and will enable us to decide the question with some certainty. Knowing the value of a water analysis, we went to considerable trouble to procure samples from Davos, which we have analysed qualitatively, and in each one the constituents were determined. The general composition of the water shows the saline matter to consist chiefly of the carbonates of lime and magnesia with some sulphate of lime. They failed to yield either "free"

or "albumenoid" ammonia when examined by the method of Messrs Wanklyn and Chapman, nor were nitrates found. The chlorids, too, are in very small amount. They cannot, therefore, presumably, have received sewage matter. The water used by the inhabitants is collected from small streams rising in the adjacent mountain sides, and is conducted to their doors from the higher to the lower level by iron pipes, and in some places, for the greater distance, by primitive wooden conduits common throughout Switzerland.

The total solids yielded on evaporation varied from nine to eleven grains per imperial gallon. The following is an analysis of the water used for the table at the Hotel Belvedere. It flows from an iron pipe fixed in a wall on the main road, and close to the hotel :—

|                                              | Grains per<br>Imperial Gallon. |     |     |        |
|----------------------------------------------|--------------------------------|-----|-----|--------|
| Carbonate of Lime, ... ..                    | ...                            | ... | ... | 4'964  |
| Carbonate of Magnesia, ... ..                | ...                            | ... | ... | 4'506  |
| Sulphate of Lime, ... ..                     | ...                            | ... | ... | 0'931  |
| Silica with Oxide of Iron, ... ..            | ...                            | ... | ... | 0'182  |
| Chlorine (calculated as Chloride of Sodium), |                                |     |     | 0'232  |
|                                              |                                |     |     | <hr/>  |
|                                              |                                |     |     | 10'815 |

Solids by evaporation, 11'10.

Whether or not the stream received much or little contribution from melting snow in the day-time, we had no means of judging, though probably some information could have been gathered on this head had a second analysis been made of the water collected at midnight. It is well known that the flow of water in rivers having their sources in glaciers is less at night than in the day-time, as the air temperature reaches its minimum at night. The same thing, no doubt, applies to Alpine streams in winter. Taking this into consideration, the total solids of the Davos water would be higher in the summer season than when we collected our

samples, since they would not then receive the dilution due to melting snow, in which no salts are present.

The somewhat considerable proportion of magnesium carbonate will be derived from the Dolomitic limestone which is plentiful in places along the valley.

The other samples of water taken from other sources in the valley have yielded results so nearly similiar to the one mentioned that we have not deemed it necessary to insert the tables here, and the general inference to be drawn is that all the water in the Valley is exceptionally pure.



## M I L K .

Next to the water supply pure milk ranks highest in importance, more especially where it is used by invalids in large quantities. We have, therefore, given this subject careful attention, and the following specimens of cow's milk were analysed. Of the history of those sold to us at hotels or restaurants, we know nothing. The rest were collected at different farms at the evening milking, we being present. We procured equal volumes of the supply from each beast, and having mixed them, we set the bulk aside, and labelled it at once. Thus, in No. 1, the sample consisted of equal volumes of the milk of each of twelve cows. It was not analysed in Davos but in Manchester, whither it was despatched the same evening after being previously frozen, and the bottles carefully wrapped in flannel and packed in hay.

The time occupied in transit was five days. The precaution of the preliminary freezing, coupled with the low temperature prevailing in England when the parcel arrived, so far delayed the decomposition of the milk that it was quite in a fit state for analysis.

We may remark that the Swiss cattle yielding the milk were all very small beasts, and looked poorly fed, as was no doubt the case, since we understand that the Swiss peasant, in the exercise of his frugality, and habits of thrift, restricts their diet almost entirely to hay.

The beasts enjoy but little fresh air and take their fill of it when driven to water, generally in the morning and evening; but, frequently, in very bad weather, they are kept in the darkened chalets for days together. The air of a Swiss shippou is very oppressive, for the ventilation is always bad, and the temperature exceedingly high.

| No. of Sample. | Description.                                     | Total Solids. | "Solids not Fat." | Fat. | Ash. |
|----------------|--------------------------------------------------|---------------|-------------------|------|------|
| 1              | Equal vols. from three farms; 12 cows.           | 12·84         | 9·21              | 3·63 | ·73  |
| 2              | Do. two farms; 10 cows.                          | 12·76         | 9·15              | 3·61 | ·76  |
| 3              | Sample supplied in the rooms of a hotel.         | 11·72         | 9·06              | 2·66 | ·73  |
| 4              | Hotel Belvedere, supplied in a room.             | 11·40         | 8·57              | 2·83 | ·74  |
| 5              | Hotel Zür Post Restaurant.                       | 12·10         | 8·87              | 3·23 | ·78  |
| 6              | Kurhau's Milch Halle.                            | 11·81         | 9·08              | 2·73 | ·73  |
| 7              | A farm; 4 cows.                                  | 11·46         | 9·07              | 2·39 | ·77  |
| 8              | A farm supplying hotels; 4 cows.                 | 11·65         | 9·17              | 2·48 | ·78  |
| 9              | Two farms; 8 cows.                               | 12·67         | 9·20              | 3·47 | ·79  |
| 10             | A bottle of milk asked for at a farm at mid-day. | 15·59         | 8·92              | 6·67 | ·70  |

Sample, No. 10, was served by a herd-boy who went alone into the dairy. What he gave was in great part cream, as may be seen from the high percentage of fat and total solids. Taking the average of Nos. 1, 2, 8, and 9, representing the milk of 34 cows for the afternoon milking, the numbers are—

|                  |     |     |     |     |                 |
|------------------|-----|-----|-----|-----|-----------------|
| Total solids,... | ... | ... | ... | ... | 12·47 per cent. |
| Solids not fat,  | ... | ... | ... | ... | 9·17            |
| Fat,             | ... | ... | ... | ... | 3·29            |
| Ash,             | ... | ... | ... | ... | 0·76            |

The "solids not fat" consist of casein and milk sugar with phosphate of lime. By adding the water natural to milk, the centesimal composition will then be—

|                                               |              |
|-----------------------------------------------|--------------|
| Casein with milk sugar, ... ..                | 8'41         |
| Fat, .. ... ..                                | 3'29         |
| Salts consisting mainly of Phosphates, ... .. | 0'76         |
| Water, ... ..                                 | 87'54        |
|                                               | <hr/> 100'00 |

Observations on the composition of genuine milk show it to be remarkably uniform. This remark applies to the milk of a herd of cows, and not that of individual beasts. The "solids not fat" very rarely fall as low as 9 per cent., whilst the average is considered to be 9'3. The fat, however, is liable to a greater variation. Now, it is this constancy of the proportion of "solids not fat" in average milk which enables the analyst to decide to what extent the practice of watering has been carried, for it is clear that to add water is to diminish the proportion considerably. A sample of milk taken in Manchester was found to contain only 7'44 per cent. of "solids not fat," and 2'85 of fat. Since 100 parts of milk, if genuine, should contain 9'3 of "solids not fat,"

$$100 \times 7'44$$

---


$$9'3$$

will give the quantity

of genuine milk used to make 100 of the above watered article, which, in this case, is 80 parts; so that the milk-seller must have added 20 of water to make up the difference.

The analysis of sample No. 4, from Hotel Belvedere, therefore suggests that it had been diluted with water, as does that also from the Post Restaurant.

It is possible, however, that neither sample had been "doctored," but was milk collected from single cows, for it is a practice in the valley, as it is elsewhere, notably at the

---

**Milch Anstalt** in Baden-Baden, to fill a glass with milk from one cow, and to carry glasses so filled in frames to the place of consumption. No two glasses of milk collected in this manner will be comparable, and it would only be from the average analysis of many that reliable data could be secured.



**BUTTER.**

Passing now to the butter sold in Davos, numerous specimens were collected in the village, from hotels and elsewhere. They were in all cases found to be pure butter. Some had an unpleasant taste and cheesy smell, whilst an examination showed that the butter-milk had not been removed as carefully as it should have been.

The following are analyses of two samples, which show their general composition :—

|                                                          | No. 1. |
|----------------------------------------------------------|--------|
| Sp. gr. of the " Butter Fat " at 205° F., ... ..         | 0·871  |
| Insoluble fatty acids per cent. in the " Butter fat,"... | 85·91  |

**COMPOSITION OF THE BUTTER.**

|                       |        |
|-----------------------|--------|
| Moisture, ... ..      | 9·910  |
| Fat, ... ..           | 88·480 |
| Casein (curd), ... .. | 1·363  |
| Salt, ... ..          | 0·067  |
|                       | <hr/>  |
|                       | 99·820 |

|                                                  | No. 2. |
|--------------------------------------------------|--------|
| Sp. gr. of the " Butter Fat " at 205° F., ... .. | 0·870  |
| Insoluble fatty acids per cent., ... ..          | 85·46  |

**COMPOSITION.**

|                       |        |
|-----------------------|--------|
| Moisture, ... ..      | 9·520  |
| Fat, ... ..           | 88·960 |
| Casein (curd), ... .. | 1·223  |
| Salt, ... ..          | 0·096  |
|                       | <hr/>  |
|                       | 99·799 |

It will not be out of place here to state that what is known as "Butterine," a factitious substitute for butter, is made by churning clarified animal fats with milk.

By this means the fat acquires somewhat the taste and odour of butter when freshly prepared. It is then salted, and suitably coloured.

We are pleased to say that we did not meet with this article at Davos though it is largely manufactured on the Continent as well as at home, and the trade in it is said to be a profitable one.

"Butterine" is known by the sp. gr. of the fat which is lower than that of genuine butter, as well as by the much higher percentage of "Insoluble Fatty Acids."

Some English samples yielded over 95 per cent. of these acids, whilst the fat had a sp. gravity of about 0.860 at 205° F.



## B E E R S.

The beers usually drunk in Davos are, for the most part, of foreign origin, and preference seems to be given to the German and Bohemian "brews," though Guinness's stout and Bass and Allsopp's ales are procurable in the hotels, but the price, of course, is high, and it is doubtful whether the lighter kinds are not preferable, especially for invalids. Our samples were collected at various places. We may remark, *en passant*, that German brewers make an excellent description with malt and hops, differing from our English infusion in the manner of its preparation. Unlike ours, much of the German beer is not fermented with "top" but with what is known as "under" yeast, whilst the time occupied in the fermentation lasts much longer. The characteristic flavour of the "Bock" beers is said to be caused by an aromatic principle peculiar to German hops. The following are analyses of beer most in request by the visitors. The numbers represent parts by weight in 100 parts by volume :—

|                                                 | Ulmer<br>Bock. | Bock. | Erlanger<br>Bock<br>from<br>Kurhaus<br>Hotel. |
|-------------------------------------------------|----------------|-------|-----------------------------------------------|
| Sp. gr.,... ..                                  | 1·015          | 1·031 | 1·019                                         |
| Alcohol by volume, ... ..                       | 6·200          | 5·800 | 5·700                                         |
| Carbonic Acid, ... ..                           | 0·245          | 0·379 | 0·446                                         |
| Acetic Acid, ... ..                             | 0·072          | 0·102 | 0·060                                         |
| Sugar,... ..                                    | 0·800          | 1·800 | 1·040                                         |
| Ash, ... ..                                     | 0·256          | 0·240 | 0·260                                         |
| Total Solids, ... ..                            | 5·410          | 7·014 | 5·664                                         |
| Water and other constituents<br>not determined. |                |       |                                               |

|                                              |     |     |     |     |     | A Lager Beer. |
|----------------------------------------------|-----|-----|-----|-----|-----|---------------|
| Sp. gr.,                                     | ... | ... | ... | ... | ... | 1'019         |
| Alcohol by volume,                           | ... | ... | ... | ... | ... | 5'500         |
| Carbonic Acid,                               | ... | ... | ... | ... | ... | 0'267         |
| Acetic Acid,                                 | ... | ... | ... | ... | ... | 0'078         |
| Sugar,                                       | ... | ... | ... | ... | ... | 1'250         |
| Ash, ...                                     | ... | ... | ... | ... | ... | 0'230         |
| Total Solids,                                | ... | ... | ... | ... | ... | 6'234         |
| Water and other constituents not determined. |     |     |     |     |     |               |

We contrast the above with two analyses of English beer and one of bottled "Pilsener."

|                                              | English Draught<br>Bitter Ale from a<br>Manchester Hotel. | English<br>Mild Ale, |
|----------------------------------------------|-----------------------------------------------------------|----------------------|
| Sp. gr., ...                                 | 1'014                                                     | 1'018                |
| Alcohol by volume, ...                       | 5'300                                                     | 4'300                |
| Carbonic Acid, ...                           | 0'267                                                     | 0.270                |
| Acetic Acid, ...                             | 0'048                                                     | 0.120                |
| Sugar, ...                                   | 0'800                                                     | 2.500                |
| Ash, ...                                     | 0'308                                                     | 0.356                |
| Total Solids, ...                            | 4'760                                                     | 6.587                |
| Water and other constituents not determined. |                                                           |                      |

|                                              |     |     |     |     |     | Pilsener Beer in Bottle. |
|----------------------------------------------|-----|-----|-----|-----|-----|--------------------------|
| Sp. gr.,                                     | ... | ... | ... | ... | ... | 1'007                    |
| Alcohol by volume,...                        | ... | ... | ... | ... | ... | 2'900                    |
| Carbonic Acid,                               | ... | ... | ... | ... | ... | 0'334                    |
| Acetic Acid,...                              | ... | ... | ... | ... | ... | 0'054                    |
| Sugar,                                       | ... | ... | ... | ... | ... | 0'600                    |
| Ash, ...                                     | ... | ... | ... | ... | ... | 0'152                    |
| Total solids, ...                            | ... | ... | ... | ... | ... | 3'324                    |
| Water and other constituents not determined. |     |     |     |     |     |                          |

The ash of beer consists of phosphates extracted from the malt, together with the saline constituents natural to the water with which the beer is made. In some common public-house beers in England the ash is higher than in the above samples, and contains much common salt added, we

are informed, to promote thirst, thereby tending to an increased consumption and consequently larger profit to the publican.



## B R E A D .

Several samples of bread when analysed were found free from alum, nor was any mineral weighing substance present. The average moisture in the small rolls served at hotel tables was 34·8 per cent., and the ash only 0·946 of which salt formed the chief part. The dark brown slightly sour bread contained 33·3 of moisture, and gave on incineration 2·04 of ash.



## W I N E S.

We now come to the wines which, under the name of "Veltinas," are largely sold in all the hotels. The names of the wines mostly drank are—Montagner, Sassella, Grumello, and Inferno, and they are grown in the Val Tellina district.\* The following analyses are of the red wines. The samples were obtained from Herr Gredig, who is an agent for them at Davos Dörfli.

He informed us that he selected the casks himself in the district where the wine is grown. Samples were bottled in our presence. All are of 1878 vintage, except the Grumello, which is two years older.

It is possible, therefore, that Herr Gredig's wines were the best of the kind to be obtained in the valley—

## MONTAGNER.

|                                                    | Herr Gredeg's<br>selection. | Sample purchased<br>at Hotel Belvedere. |
|----------------------------------------------------|-----------------------------|-----------------------------------------|
| Sp. gr., ... ..                                    | 0'9975                      | 0'9975                                  |
| Alcohol by volume, ... ..                          | 10'660                      | 10'580                                  |
| Total fixed Acid calculated<br>as Tartaric, ... .. | 0'840                       | 0'840                                   |
| Volatile Acid calculated as<br>Acetic, ... ..      | 0'036                       | 0'030                                   |
| Bitartrate of Potash, ... ..                       | 0'140                       | 0'130                                   |
| Sugar, ... ..                                      | 0'300                       | 0'280                                   |
| Ash, ... ..                                        | 0'240                       | 0'240                                   |
| Total solids at 212° F., ... ..                    | 2'280                       | 2'100                                   |
| Water and other constituents<br>not determined.    |                             |                                         |

\* The Val Tellina (locally pronounced Veltina) is a fertile and beautiful valley in Italy, commencing at Colico at the head of Lake Como, and is bounded on the north by the Bernina range of mountains.

|                                                    | Sample purchased<br>at Kurhaus Hotel. | Sample purchased<br>at Hotel Zür Post. |
|----------------------------------------------------|---------------------------------------|----------------------------------------|
| Sp. gr., ... ..                                    | 0.9982                                | 0.9982                                 |
| Alcohol by volume, ... ..                          | 10.500                                | 10.540                                 |
| Total fixed acid calculated<br>as Tartaric, ... .. | 0.705                                 | 0.697                                  |
| Volatile acid calculated as<br>Acetic, ... ..      | 0.084                                 | 0.075                                  |
| Bitartrate of potash, ... ..                       | 0.150                                 | 0.120                                  |
| Sugar, ... ..                                      | 0.310                                 | 0.260                                  |
| Ash, ... ..                                        | 0.260                                 | 0.220                                  |
| Total solids at 212° F., ... ..                    | 2.040                                 | 1.810                                  |
| Water and other constituents<br>not determined.    |                                       |                                        |

## HERR GREDIG'S SELECTION.

|                                                 | Sassella. | Grumello. | Inferno. |
|-------------------------------------------------|-----------|-----------|----------|
| Sp. gr., ... ..                                 | 0.9975    | 0.998     | 0.9975   |
| Alcohol by volume, ... ..                       | 11.000    | 10.830    | 10.75    |
| Total fixed acid calculated as Tartaric, ... .. | 0.592     | 0.675     | 0.495    |
| Volatile acid calculated as Acetic, ... ..      | 0.030     | 0.060     | 0.024    |
| Bitartrate of Potash, ... ..                    | 0.094     | 0.141     | 0.094    |
| Sugar, ... ..                                   | 0.280     | 0.320     | 0.330    |
| Ash, ... ..                                     | 0.192     | 0.258     | 0.252    |
| Total Solids at 212° F., ... ..                 | 1.970     | 2.150     | 1.760    |
| Water and other constituents<br>not determined. |           |           |          |

The above shew the general composition of the red wines of the Veltlina, while the Sassella is highest in alcoholic strength. The white wines do not seem so much in demand judging from their absence on hotel tables. Besides the

Sondrio is the capital of the district. The whole valley is celebrated for its wine, and nearly all the inhabitants are engaged in the cultivation of the vine. At *Sassella* is a curious old church built on a projecting rock. Figs, grapes, and pomegranates are grown here to perfection; and dominating the village are the snow clad peaks of *Monte della Disgrasia*. *Morbegno*, near *Colico*, and in the lower part of the valley, produces a great deal of excellent silk. All the *Val Tellina* wines are cheap and good, but do not seem to keep well out of bottle.

---

constituents given in these partial analyses, there are in all wines small quantities of what are termed "compound *Æthers*" which impart to them a peculiar flavour and bouquet. To determine them would have required very much larger quantities of each specimen than we had at our disposal.

We observed that none of the above wines kept well after being opened in England, mould appearing in about fourteen days.



## HOW TO REACH DAVOS AND WHAT TO WEAR.

A reference to our route map will show that the line of railway from Zurich terminates at Chur, also called Coire, which is the capital of the Canton Grisons, and has a population of nearly eight thousand. The station before Chur is Landquart, and these two points are the starting places for the diligence routes (marked in red) for Davos. The difference in time occupied in traversing the two routes will be gathered from the following table:—

### SUMMER SEASON AT DAVOS.

#### DILIGENCE:

FROM 15TH OF JUNE TO 15TH OF SEPTEMBER,

|                  |                      |                                                          |
|------------------|----------------------|----------------------------------------------------------|
| Dep. Landquart   | 5.45 A.M., 2.30 P.M. | } <i>vid</i> Küblis Klosters<br>in 7 hours.              |
| Arr. Davos-Platz | 1.05 P.M., 9.40 P.M. |                                                          |
| Dep. Coire       | 11.0 A.M.            | } <i>vid</i> Lenz Wiesen in 9 hours.                     |
| Arr. Davos-Platz | 8.0 P.M.             |                                                          |
| Dep. Coire       | 5.30 A.M.            | } <i>vid</i> Thusis Tiefenkasten-Wiesen<br>in 13½ hours. |
| Arr. Davos-Platz | 8.0 P.M.             |                                                          |

### WINTER SEASON AT DAVOS.

FROM 16TH OF SEPTEMBER TO 15TH OF APRIL.

#### DILIGENCE:

|                  |           |                                              |
|------------------|-----------|----------------------------------------------|
| Dep. Landquart   | 10.0 A.M. | } <i>vid</i> Küblis Klosters<br>in 7½ hours. |
| Arr. Davos-Platz | 5.30 P.M. |                                              |
| Dep. Coire       | 7.0 A.M.  | } <i>vid</i> Lenz Wiesen.                    |
| Arr. Davos-Platz | 4.0 P.M.  |                                              |
| Dep. Coire       | 5.0 A.M.  | } <i>vid</i> Thusis<br>Tiefenkasten Wiesen.  |
| Arr. Davos-Platz | 4.0 P.M.  |                                              |

It will thus be seen that from Chur to Davos *vid* Lenz and

Wiesen nine hours are occupied, while the journey is completed in seven from Landquart. On the first blush, therefore, it would seem as if the Landquart route were the best, and on account of this two hours' difference all the hotel circulars recommend it. The inconveniences and discomforts, however, are so great that we strongly advise travellers to start from Chur—firstly, because Landquart is simply a dirty little roadside station, with the very worst of hotel accommodation; secondly, because constant changes have to be made from one vehicle to another. The first few miles are generally performed by a diligence on wheels, but as soon as the hard snow is reached, small, dirty, ill-constructed, two-seat *open* sledges are substituted. In one of these things you settle down, enveloping yourself in your furs and wraps; but before you have gone very far you are bundled out again, and told to get into another box, and this changing is repeated several times. The necessity for this is one of those mysteries of Continental travelling for which no amount of inquiry on the part of the alien can find a satisfactory solution.

On the other hand Chur, which is only fifteen minutes further on by train from Landquart, is an important town, and possesses several very fair hotels. The Government mail route starts from Chur, and the *only* change necessary is from the wheeled vehicle into a large *closed* sledge which goes right through to Davos. At Lenz a halt is made for dinner, which may be procured at a moderate price in the Hotel Krone, or Post.

From England there is a choice of several routes. Of course it will be understood that *Bâle* is the point always to be made for. The railway journey from *Bâle* to Chur *via* Zurich, where you change carriages, occupies about 6½ hours.

1st, Bâle can be reached *viâ* Paris and Strasbourg—time from London about 28 hours. Delicate people, however, should spend the night in Paris.

2d, *Viâ* Queenborough, Flushing, Brussels.

3d, *Viâ* Harwich, Rotterdam, Heidelberg.

4th, *Viâ* Ostend, Brussels.

5th, *Viâ* Calais and Brussels.

The last named route is, to our mind, decidedly to be preferred for invalids. If the night express from London be chosen, it leaves Holborn Viaduct at 8.15, and Ludgate Hill a few minutes later. Calais is reached about twelve o'clock. The train for Brussels departs from thence at 1.25 a.m., and arrives at Brussels at six in the morning. The day should be spent in Brussels, and we can strongly recommend the Hotel de L'Europe situated in the Place Royale. It is a most comfortable and reasonable house. It is about a mile from the arrival station and close to the station for Switzerland. English is spoken by all the servants. From Brussels to Bâle there is only one fast train in the twenty-four hours. It leaves at 7.30 in the evening, arriving at 9.49 in the morning. The journey occupies 14 hours 19 minutes. The distance is 365 miles. First class fare, 62 francs 50 centimes; second class, 44 francs 90 centimes. The route is *viâ* Namur, Arlon, Luxemburg, Metz, and Strasburg. Time occupied by the ordinary trains is 23 hours 15 minutes. It is better to chose the night train. The carriages are well warmed and comfortable. Luggage is examined at *Bettinger*. The fast train for Zurich—distance 55½ miles—leaves Bâle at 10.15, twenty-five minutes after the arrival of the Brussels train. Time occupied on the journey 2 hours 20 minutes. First class fare, 9 francs 30 centimes; second, 6 francs 55 centimes. The train leaves Zurich for Coire—distance 73½ miles—at 2.33. Time occupied, 4 hours 27 minutes.

First class fare, 12 francs 30 centimes ; second, 8 francs 65 centimes. *Through* tickets should be taken at Bâle for Chur. The night will be spent at Chur, and Davos-Platz reached the following evening. We may mention here that the Chur diligence route is infinitely more beautiful than the Landquart route.

As regards clothes, it is essential that they should be warm and light. Good thick fur gloves, woollen stockings, a fur-lined coat will be useful for gentlemen, and a Shetland shawl for ladies. Boots should be well made, with thick soles and plenty of nails, and come well up in the leg. They should be large enough to admit of a cork or woollen sock. *Good boots cannot be bought on the Continent.* Blue or smoked spectacles are useful for those whose eyes are at all sensitive to brilliant light, as the glare from the snow is trying.

Luggage accompanying the passenger can be registered through from London to Brussels *only*. It must be re-registered from there to Bettinger on the frontier, and then re-registered again for Davos. It is better to send heavy luggage beforehand by *Petite Vitesse*, registering it right through to Davos, and declaring the contents. It should also be insured. By *Petite Vitesse*, it would be *fourteen days* on the road at least.

As we have frequently been asked by visitors to Davos for information about the different routes to Italy, we reprint the following article by Mr J. E. Muddock which appeared in *Time* for May 1880 :—

#### OVER THE ALPS IN WINTER.

“Less than a hundred years ago a journey across the Alps, even in summer, was looked upon as such a hazardous undertaking, that no traveller attempted it unless compelled by

stress of circumstances, and only then after solemn reflection, and when every precaution had been taken against highly probable contingencies. It is true that large bodies of troops frequently threaded the passes, but it was always at the cost of many lives. Even as recently as the year 1800, General Macdonald led a division of troops across the Splügen; but in the course of the terrible march large numbers of the soldiers were swept away by avalanches. Since then, however, the conditions of things have somewhat altered. Not that the forces of Nature are different; but man has brought his skill to bear, and constructed wonderfully engineered roads where formerly only bridle-paths existed.

"Being in Davos-Platz, I conceived the idea of making a hurried journey into Italy by the renowned Splügen Pass, and returning by the equally renowned Simplon. Not a few people, when they heard of my intention, expressed surprise, and suggested the probability of falls over precipices or destruction by ice-avalanches, which in the winter are more to be dreaded than falls of snow. Undeterred, however, by these dismal forebodings, I left Davos by diligence early one fine morning in January, and travelled to Thusis, which is twenty miles from Davos. The route is through some of the most charming of Alpine scenery, and includes the justly celebrated Züge Gorge, the Pass Mal, and the Schyn Pass. Thusis, which stands at the entrance to the Via Mala, which is also the commencement of the Splügen, is a quaint Swiss town, situated in a valley, and dominated by a lofty range of snowclad peaks. The town, being in direct communication with Italy, wears a semi-Italian air. Sleighs, laden with casks of wine, stand about the streets, and curious fountains here and there tend to increase the impression that one is already on Italian soil. Chiavenna, however, is forty miles away, and the frontier line thirty.

The Splügen is the highway between Chiavenna and Thusis, and it may justly be said of this pass that it is one of the grandest and most wonderful in the whole world. It is supposed, on good authority, that the Romans were well acquainted with it, and used it as a means of communication between Italy and Switzerland. At the present time there is a daily post between the two countries *via* the Splügen, excepting when the pass is blocked by snowstorms and avalanches.

"At half-past seven in the morning I left Thusis in an open sledge. The sun was rising in regal magnificence, and smiting into quivering gold the snowclad peaks that towered up into a turquoise sky. Within ten minutes of leaving the town the Via Mala is entered. This is a narrow gorge five miles in length, which runs between walls of rock from 1500 to 2000 feet high. It seems as if, in a far-off age, some mighty cataclysm had shattered the mountains to pieces. Everything is stupendous. Enormous masses of rock overhang the road, and seem as if they only wanted a touch to bring them down with an appalling crash. Lateral openings give one a view of still higher peaks all splintered into the most fantastic outlines. About two miles from Thusis is a long tunnel, which penetrates a mighty spur of projecting rock. From the entrance the roaring river, at the bottom of a gorge, is visible, and the retrospect is one of the sternest and most savage grandeur imaginable. But at the second bridge, which spans the ravine, the view is even more imposing, if that be possible. The cliffs almost meet overhead, and 300 feet below the young Rhine thunders, and lashes itself into fury against its confining walls of limestone rock. Soon after leaving this point the Via Mala ends, and one is inclined to draw a sigh of relief as he emerges from the sombre gloomy passage into the open valley of Schams.

Nothing could be more impressive than the *Via Mala* under its winter aspect. From its riven walls stupendous masses of ice hang. This ice is formed by water trickling over the rocks, and gradually freezing, until it assumes colossal proportions. I saw one sheet of ice nearly twenty feet in thickness, over a hundred feet high, and eighty feet broad. It hung over the road in a very threatening manner. The imagination may picture what the effect would be if such a mass of ice came down on to the road, and yet this is by no means an infrequent occurrence.

"Soon after entering the valley of Schams we arrive at Zillis, the first village. It is 3061 feet above the sea, and is overshadowed by the immense Piz Beverin, 9843 feet high. From here we pass on through a series of beautiful scenes to Andeer, seven and a half miles from Thusis, where horses are changed. Soon after the road enters the Rofna Ravine, three miles long, which bears some resemblance to the *Via Mala*. When the end of the ravine is reached, a wonderful prospect bursts upon the view as the Alpine landscape of the Rheinwaldthal opens out. Great mountains shut in the valley, the most conspicuous being the Tambohorn, 10,748 feet, which bears on its sides a vast glacier. When another mile has been traversed we come to the village of Splügen, and here one begins to realise that he is in a world of snow and ice. The vegetation grows scantier, and even the hardy pine-trees struggle for bare existence. Splügen is 4757 feet high, and soon after leaving the hamlet desolation begins. The road winds upward into a lonely valley, where the snow lies all the year round. The valley is a sort of basin in the very heart of a vast range of peaks and rocky spires on which human foot has never yet been set. One wonders how he is going to get out of the basin, where never a tree or blade of grass breaks the monotony of the glittering

snow ; but presently the road is seen winding up one of the mountains like a writhing serpent. This series of zigzags takes a considerable time to accomplish, and then presently you pass through a long gallery of masonry built to protect the road from avalanches, and when you emerge, behold, you are on the summit of the Splügen Pass 6945 feet above the sea. And what a view is spread around ! The Alps, as I saw them, were glittering in golden light, while above the lapis-lazuli sky was without even the suspicion of a cloud. One's breath was almost taken away by the inconceivable magnificence of the scene. It was a panorama of great extent, embracing range upon range of splendid snowclad mountains ; while far away in the blue distance, where mass upon mass of rocky aiguilles rise, the town of Chiavenna nestles, though the town itself cannot be seen from this spot.

“ A little beyond the summit the first *cantoniera* or refuge is passed, and then comes the *dogana* or Italian custom-house. It is an awfully lonely situation this, and in the winter the snow often reaches to the windows of the first floor. In the four highest houses of refuge bells are kept constantly ringing, as a guide to travellers during snow-storms. The road now descends gradually by numberless zigzags along the east slope of the mountains ; and so dangerous is this part of the way that within a short distance there are no fewer than three galleries, 249, 228, and 550 yards respectively in length. They are constructed of massive masonry, and covered with sloping roofs, supported by pillars, to enable the snow to slide off. They are lighted by apertures in the side next the ravine. As the third gallery is quitted, a view is obtained of the little village of Isola, which is far down in the valley below. It looks like a number of toy-houses that have been carelessly shaken out of a box. It is dangerously situated at the base of a stu-

pendous mountain, and has been frequently swept away by avalanches, but as frequently rebuilt by the poor inhabitants, who cling with strange fidelity to their native village, which may be said to stand ever on the verge of destruction. Still descending, we come to more galleries. The scenery grows wilder and grander, and presently the road is observed winding along the edge of precipices ; while a profound gorge, walled in by mighty walls of rock and giant mountains, stretches away and away as far as the eye can reach. Soon we come to another gallery, built on the extreme verge of a frightful precipice. The scenery now is strangely weird and yet sublime. There are great heights, there are wonderful depths. Nature here asserts her supremacy, and defies man to tame her. Out of the face of a perpendicular wall of rock the road is carved hereabouts ; and here there are three galleries, exactly one above the other, owing to the twisting of the road. When the traveller has passed through the first, he drops down and goes through the second, and so on to the third. It is perfectly marvellous how the road was ever constructed in the face of such obstacles. On the opposite side of the profound gorge is the wonderful Tambohorn, with its enormous glacier. This mountain is nearly 11,000 feet high. Down and down goes the road, and the mountains become so awfully precipitous that their black repellant-looking rocks are swept clear of snow. At Pianazzo, a scattered hamlet inhabited by poor peasants, there is a magnificent waterfall. The water comes down a gorge, passes under the road, which is carried upon a stone bridge, and then throws itself in one leap over a perpendicular wall of rock that plunges down 700 feet. When I saw it, gigantic pillars of ice had formed up the sides, and below was a huge glacier. The roar of the water was deafening.

"The next village is Campo Dolcino, which is 3553 feet above the sea. Here the open sledge was exchanged for a diligence on wheels. Looking ahead, the perspective is bounded by a giant range of snow-peaks, and all around are terrific precipices and black mountains, their sides deeply riven and gashed. The road still winds down, and is protected, on the precipice side, by a massive arched wall. The four powerful horses are "tooled" with infinite skill round the sharp curves, for these mountain-drivers have no rivals. For two or three miles the way is through a strange wilderness, a wreck of mountains. The slopes are strewn with masses of rock and boulders of every shape and size. They are piled up in some places until they resemble the ruins of a colossal temple. Here, again, is what seems to be a Druidical circle, and there are the crumbling remains of some great castle. This is one of the most curious spots to be found in Italy. It is a fantastic, grim, weird region, the haunt of the mountain demons. There are hundreds of thousands of boulders scattered about. They are all black, and perfectly bare of vegetation. Only here and there does a patch of snow relieve the forbidding sombreness of the shattered mountains; and as one looks up and sees how the tops of these peaks have been whirled off by the silent yet mighty forces of Nature, he is led to speculate whether the disintegration which is going on in mountainous regions will not, in some far-off age, reduce the mountains to mere knolls. This Liro Valley, as it is called, is certainly one of the most remarkable places I have ever seen. It is a region of chaos, of ruin, of death. There is literally an infernal weirdness about the scene that at once suggests Dante's pen and Doré's pencil; and yet it is very wonderful, very grand, very fascinating, and when once beheld can never be forgotten. One could imagine it being the battlefield of giants, who had

vesper-bells. Winter time though it was, and though the trees were bare of foliage, the whole scene was one of impressive beauty not likely to be soon forgotten.

"At twelve o'clock at night I left Arona, in a lumbering old diligence, for Domo d'Ossola, *en route* for the Simplon, my destination being Brigue, in the Rhone Valley. For many miles the road skirts the lake, which was lying like a huge mirror jewelled with stars. Swiss and Italian diligences are about the most uncomfortable vehicles to travel in that can be imagined. The object of their inventor would seem to have been to put on four wheels the maximum of bulk with the minimum of space for travellers. They are reeking, ill-smelling rattle-traps, at once a shame and disgrace to any civilised nation.

"Domo d'Ossola was reached at six o'clock in the morning, and by that time I was nearly frozen to death. I managed to worm myself out of the box in which I had been packed; and while the horses were being changed, I stamped and chafed my limbs into warmth again. Two or three sleepy Italians were hanging about; and they looked at me, as I imagined, half pityingly, half contemptuously, as though they were thinking, "Ah, only a mad Englishman would dream of crossing the Alps in such weather."

"When the horses had been changed, the journey was resumed. The day was just breaking, and all around great mountains seemed to suddenly rise up out of the darkness. By and by distant peaks flushed crimson as the sun got higher, and soon the beauty of a golden day chased away the sombre shadows of the night. As the road here forms a steep ascent I elected to walk, so that I might enjoy the wonders of the scenery, which, at the commencement, is not unlike the Italian end of the Splügen. Soon the way narrows to a gloomy gorge that is wild and weird. At a

height of 1286 feet the first gallery is threaded, and this part of the road is well calculated to inspire one with awe. The gorge is so narrow, the mountains so high and black, the moaning of the river below in the ravine so dismal; and then the absence of the sun, which, although it smites the upper peaks into quivering fire, does not penetrate down here—all these things beget in one an impression that he is in a dream, and wandering through a scene such as Dante or Wirtz only could have imagined. Steep after steep is climbed by the labouring horses, and still the gorge continues. Presently a granite column is passed which marks the frontier, and once more we are in Switzerland, the land of grandeur. Soon a wretched hamlet called Gondo comes in sight, and here a tall square tower stands. It was erected long ago by the Stockalper family as a refuge for travellers, whom business led across this marvellous but dangerous pass. A little further on is the gallery of Gondo. This is a tunnel 250 yards in length. It is pierced through a huge block of rock which fills up the gorge. On the face of the rock is this inscription:

‘Aere Italo, 1805, Nap. Imp.’

Of course every one knows that the great Napoleon was the first to conceive the idea of a road over the mighty Simplon. He was ambitious of having a great military way into Italy, and he frequently asked his engineers, ‘*Quand le canon pourra-t-il donc passer au Simplon ?*’ The work was commenced on the Italian side in 1800, and the following year on the Swiss side. It took six years to complete, at the sacrifice of many lives, and at a cost of nineteen million francs, half of which France found, and the other half came from the ‘Cisalpine Republic.’ It was, in reality, the first great engineered route across the Alps.

"After leaving the Gondo tunnel a refuge is passed, and then comes another gallery, which in 1814 was fortified on the Italian side. Soon after passing this gallery, the road describes a wide curve, and enters the Laquinthal, through which flows the Laquinbach, which has its source in the Laquinbach glacier. There is a very steep ascent here, and the mountains are truly grand. At twelve o'clock the village of Simplon is gained, 4856 feet above the sea. There is an *auberge* in the village, established as a post and house of accommodation for travellers. It is a wretched hovel. I would advise those who may come after me not to do as I did, namely, attempt to eat the dinner provided at this place. I attempted it, and struggled boldly with the nameless messes, but had to give in at last. I could brave the dangers of the pass, but not the horrors of that feed. For my attempt I was mulct in three and a-half francs. The mess would have been dear at one.

"Up to this point the snow had been so light on the road that the wheeled vehicle was enabled to come up to Simplon, a thing that rarely happens in the winter; but a quarter of a mile beyond the hamlet we changed into an open sledge, which is not only pleasanter, but safer, in these mountain passes. Up and up we go, and soon a magnificent glacier, the Rossboden, with its moraine, comes in view. It is full of deep crevasses, and is moving down into the ravine. A mile further, and we open out a still more imposing glacier, the Raut. It is overtopped by a splendid mountain, the Rauthorn, 10,463 feet. The only vegetation that flourishes in this sterile region of perpetual snow is the hardy Alpine rose. In a few minutes more we arrive at the hospice. This is a solid stone building, standing in a wilderness of snow and ice. It was begun by Napoleon, but not finished; and in 1835 it was purchased and completed

by the St Bernard monastery, and is now inhabited by a contingent of the Benedictine monks. There are several St Bernard dogs here. One is a magnificent brute, as large as a lion. He has been the means of saving numerous lives. In snowy weather, the dogs, with a flask of brandy attached to their collars, and a rug strapped round their bodies, go out with the monks to trace the road in the snow, and give assistance if required. The animals are marvellously trained, and seem to have the capacity to do everything but speak. The hospice is built at the base of the stupendous Monte Leone, 11,696 feet. Its peak, below which is a great glacier, rises sheer up in smooth perpendicular walls. I believe it has never been ascended. It is one of the comparatively few Alpine peaks that have defied man to conquer them. On leaving the hospice the road continues to ascend for about a mile, when the culminating point of the Simplon, 6594 feet, is attained. The most dangerous part of the road is between this and the fifth refuge. Within a distance of three miles there are no fewer than six houses of refuge, exclusive of the hospice; and several galleries of extraordinary strength have been built to protect the road. One of these is absolutely carried under a glacier, the ice of which hangs over the masonry. This glacier is called the Kaltwasser, and gives birth to a waterfall, which leaps down an amazing ravine, and its thunder rings in the traveller's ears as he passes through the gallery. Both the French and Valaisians have, in times past, repeatedly fortified this part of the pass; but the works have always been destroyed by avalanches, which sweep down like whirlwinds, and, with a roar that is appalling, carry blight and destruction to everything that stands in their way. All man's daring and skill have never been able to arrest these terrific forces of Nature; and even the mighty galleries he rears to protect

himself and the road are sometimes crumpled up like match-boxes. The day I passed, the snow was in a dangerous condition, and my driver told me there would be an avalanche soon. A few years ago eight sleighs, with their passengers, drivers, and horses, were buried not far from this spot.

"To do anything like justice to the view which this part of the pass commands is nearly a hopeless task. One feels the poverty of the pen as he attempts it. No description, however exact or elaborated, could give a just idea of the reality when seen on a bright clear day. From an elevation of 6500 feet the eye wanders over an area embracing many hundreds of square miles. Below you is a wide and extensive ravine, clothed in its lower depths with luxuriant pine-forests. From where you stand, terrific precipices plunge down for 2000 feet. The road is very narrow, and has not the slightest protection on the precipice side; for anything that impeded the rush of the snow as it sweeps down the mountains would insure the destruction of the road. One is appalled as he contemplates what the result would be of a restive horse or careless driving. A poor road-mender fell over hereabouts some time ago, and so literally was he dashed to pieces, that no portion of his body was recovered.

"On the left the Alps of the Bernese Oberland stretch in one unbroken chain of snowy peaks, including the magnificent Jungfrau; jagged ridges, great glaciers, tremendous precipices, meet one at every turn. It is a scene in which the smallest detail is on a scale of almost incomprehensible magnitude. The mighty Aletsch glacier is seen to perfection; while before you, and far, far below, stretches the Rhone Valley, with its pine-forests and villages, forming the most perfect picture of a landscape, in which giant mountains covered with eternal snow are the main features, to be found

in the whole world. You positively feel dumb and helpless, as it were, in the presence of such sublimity. As I saw this picture it was, indeed, beautiful. Nay, beauty is a mean word to apply to such a scene, which was one of ravishing grandeur—a scene of bewildering enchantment called into being by the mighty magician, Nature. The sun was declining; and the great peaks, crushed, shivered, splintered, sharp, seemed surrounded with a network of delicate lines and modellings of light and passing shadows. Sometimes a gauzy veil appeared to drop down over some massive pinnacle; then it slowly dissolved away, leaving the peak flushed with red gold, caught from the sinking sun. Colour and force, height and depth, beauty of outline and grace of curve, softness and tone, every gradation of light and shade, splendour and brilliancy, majesty and might, were all here to make this one of the most imposing and sublime panoramas the eye could possibly behold. One felt strangely impressed with a sense of unrealisable immensity. The mind grew confused in trying to grasp all the features of the picture. Admiration grew into wonder, and wonder into awe—the awe of fascination. Above the road stupendous masses of ice and snow seemed poised ready to thunder down, and the driver ceased to crack his whip lest the vibrations should disturb the impending heaps, and bring them upon us with a whirlwind of destruction.

“From this point the road descends in long windings. There are over 5000 feet to go down before Brigue is reached at the head of the Rhone Valley. Many galleries are required, and they are all built on the extreme verge of dizzy precipices. The wonder is how they were constructed in such positions. I understand that their construction cost many lives.

“At Berisal, the last post hamlet before Brigue, the open

sledge was changed for wheeled diligence, and then we tore down the serpentine road at a marvellous speed, the four horses being managed with a skill calculated to arouse the envy of the best of City whips. At one point, however, we came within an ace of a catastrophe. At a very steep part, and at a dangerous curve in the road, water had flowed and frozen into a huge sheet of solid ice. As we tore down here the wheels lost their grip on the ice, and the lumbering vehicle slid sideways towards the edge of the precipice. I was jammed up in the *coupé*, which was little larger than a good-sized handbox. I saw the peril ; but to have jumped out, as one might do from an open sleigh, was an absolute impossibility. Two travelling pedlars, Italians, who had been picked up on the way, were in the body of the diligence, and they uttered a cry of despair, and made a frantic effort to get out. The driver recognised the danger instantly, and, with wonderful presence of mind, he lashed the leaders into a gallop, keeping them well towards the mountain-side of the road. As the ponderous vehicle swung round, it was poised for a moment on two wheels, and the hind part hung over the precipice. As soon as we were dragged into safety, the horses, which had become frightened and restive, were stopped. The Italian pedlars sprang out ; they were as pale as death, and I saw them both cross themselves devoutly. I walked back and stood on the edge of the precipice. There was a clear fall of over 1000 feet on to needle-rocks. As I gazed into the profound depths I felt that we had escaped utter annihilation by the skin of our teeth only, and the line from Euripides instantly occurred to me,

‘ How pleasant it is for him who is saved to remember his danger ! ’

Having got the horses calmed, we proceeded at a less rapid rate, though all peril had not quite passed, as in many parts

the road was little better than a glacier, and the exercise of great care was required in driving over the ice.

"The sun had set now. The great distances had faded into violet shadow ; but on the mighty peaks the Alpenglüth lingered, and so wonderfully beautiful was the effect, that it almost seemed unearthly. It was as if the snowclad mountains had become transparent, and through the medium of this transparency shone a glowing rose-coloured light. Very gradually this glory dissolved away, and purple gloom stole up and up, infolding height after height, until at last the scene was hidden away, and the only salient points were the aiguille-like outlines of the mountains as seen against the star-studded sky.

"Very soon we rattled down the steep narrow street of Brigue, and the crossing of the Simplon was a *fait accompli*. It had been a long journey, and I had had no sleep for thirty hours, so that I was glad of the accommodation which the only inn then opened in Brigue offered.

"On the following day I continued my journey down the superb Rhone Valley, which I had the opportunity of seeing under the most favourable atmospheric conditions. The sky was cloudless, the sun brilliant ; but as the Lake of Geneva was neared, we passed from golden light to clinging mist, that thickened to a dense fog. For more than thirty days Geneva had been enveloped in this fog, and not even a glimpse of the sun had been seen. I was two days in the town, and never once saw the lake ; and so I was glad to get away, and went on to Berne, one of the oldest and most picturesque of Swiss towns. But here the weather was bad also ; and so I turned my steps homewards, after a delightful, if rapid, journey that had taken eighteen days to accomplish, and during which I had travelled nearly all round Switzerland, through a large part of Italy, and crossed the Alps

twice, by two of the most wonderful and beautiful of the Alpine passes ; and this in mid-winter, when it is generally supposed that there is nothing to be seen, nothing to interest. I can only say that the beauty of the Alps, as I saw them, white with the winter snows, and glittering in the winter sun, will ever linger with me as a memory and a dream."

The following article on the ascent of the Schwarzhorn by Mr Muddock, which appeared in the *Sheffield Telegraph* of March 11, 1880, will be specially interesting to visitors to Davos :—

#### ALPINE CLIMBING IN THE WINTER.

"Everyone is supposed to know something about Switzerland in the summer ; but Switzerland in the winter is known to comparatively few. Happening to be in Davos-Platz at Christmas time in company with Mr W——, a genial gentleman and a member of the Alpine Club, we were both desirous to do some mountain work, as the weather was exceptionally fine. Davos-Platz being in Eastern Switzerland, the mighty giants of the Alps are far away, but there are many peaks in the neighbourhood of this charming valley which are worthy the not too ambitious climber's attention. Amongst these is the Schwarzhorn, 10,338 feet, and bearing a glacier on its massive sides. It is a solitary peak, the highest in the range, and stands out in lonely majesty between the Flüela Pass, one of the principal routes to the Lower Engadine, and the Dischma Thal, a narrow lateral valley running from Davos. My friend and I discussed the practicability of sitting on the head of this lofty peak, and, though a few timid people suggested the possibility of avalanches and falls into unknown depths, we determined to make the attempt, and so applied to Mettler, a renowned chamois hunter, to be our guide. He is a short,

powerfully built man with a bronzed, iron, deeply furrowed face, and a pair of wonderfully keen and deeply set eyes. The 27th of December was fixed for the excursion, and it was arranged that we were to rise at four, have some breakfast before starting, and then drive by sledge up the Flüela Pass to the Hospice close to where the ascent commences, and which is ten miles away from Davos.

"We completed our arrangements the night previous. The sleigh was ordered, Mettier was to be at the hotel at five a.m. sharp; the head waiter was instructed to have a cold fowl, a bottle of brandy, and the necessary adjuncts of cheese and bread ready packed over night, while the cook was to rise early and prepare coffee.

"We retired to bed at ten o'clock. I slept soundly, and when the porter thundered at my door I could not realize that the hour for rising had arrived. I confess that at that moment the warm blankets had an unusual attraction. I made a supreme effort, however, and sprang from bed. By the dim light of a candle I performed my ablutions, having to break the ice in my jug to get the water. Then I wriggled into stiff, heavily-nailed, well-greased Alpine boots, adjusted snow gaiters, and thus equipped, went into the cold, dismal-looking dining room, where a sickly lamp made everything appear as cheerless as it is possible to imagine. In a few minutes I was joined by my friend, who, like myself, was attired in the orthodox Alpine costume. The sleepy waiter shuffled about, seeming to utter a complaint with his feet at being compelled to leave his bed at such an untimely hour. Having discussed our coffee, W—— and I lit our pipes and went on to the verandah. Oh, how intensely cold it was! Our very marrow seemed chilled, as well as it might be, for the thermometer marked 17 deg. below zero, or forty-nine degrees of frost (Fah.) But oh, the glory of the night!

The great stars shone with a brilliancy never experienced in foggy Britain. A strange, almost unearthly silence reigned in the valley. The white mountains looked weird and mystic in the ghostly light. Over one peak Venus was just rising with a lustre and a glory that cannot be imagined. One of her points seemed to rest upon the crest of the mountain, and shed a halo round it.

"Faithful to his appointment the old guide arrived. Standing there in the cold, weird light of the stars he was a study for a painter, as alpenstock in hand, and the usual cowhide bag—which was to hold our provisions—strapped across his broad shoulders, he saluted us with, '*Guten morgen, mein herren; wie geht es ihnen? Es ist sehr kalt!*' We admitted that it *was* cold, and we gave emphasis to our admission by rubbing our hands and stamping our feet to keep up the circulation. In another few minutes the jingling of sleigh bells announced the approach of our conveyance, and we had soon packed away behind the sleigh our alpenstocks and ice axe, enveloped ourselves in furs and rugs, and were gliding over the hard snow on our ten miles drive through the wonderful Flüela Pass. For the first few miles only the jingle of the bells and the ring of the horse's hoofs broke the stillness. It was too cold to talk. One's very breath seemed to freeze. Soon, however, the stars paled and a strong green light seemed to diffuse itself through the Pass; then the green changed to a faint, roseate flush that tinged the snow, and presently—imperceptibly—a golden glow spread over the mountains; we saw the long rays of the rising sun shoot up into the blue heavens, and lo! it was day. Then our blood thawed, speech came to us, we chatted and laughed, and the old guide predicted magnificent weather.

"We toiled up the steep Pass, and at every turn new beauties opened out, until the lonely hospice in that stern

wilderness of snow and ice was reached at a quarter to nine. We sprang joyfully from the sleigh, glad once more to be on our feet; and looking up in the clear air, with the sun smiting it into a quivering mass of gleaming gold, we saw the towering rocky spire of the Schwarzhorn which we had come to conquer. It stood out far above its surrounding satellites—a monarch amongst those mountains. At the hospice we breakfasted, and then at 9.25 we started on our journey with the '*Bon voyage*' of mine host ringing in our ears.

"How grand was the scene as the snow-clad, sun-flushed mountains rose up on all sides, while overhead was the brilliant, perfectly cloudless, turquoise dome. It was evident we were going to have a scorching and beautiful day.

"The silence of the wilderness was unbroken, the air was absolutely still. We proceeded down the Pass in the direction of the Engadine for half a mile, then branched off, and commenced to ascend—a great mass of precipitous rock being our first goal. The guide led; Mr W—— was in the middle; I brought up the rear, carrying the ice axe. The snow was very soft and deep, and we sunk sometimes above the knees. It was hard and trying work, but we went merrily on. The guide being some yards in advance, and consequently higher than we, seemed surrounded by a brilliant and dazzling halo as the glittering sunlight played about him. This effect was very striking. At length we reached the rocks, and then paused to get our breath and admire the beautiful prospect. We could not see *our* peak, as the projecting spurs hid it from sight.

"The way became more steep and difficult now. We got on to a long and declivitous snow slope that was partly frozen, and necessitated some little care, as it terminated in a precipice. We saw some ptarmigan, the only living things

besides ourselves in the weird solitude, where the dazzling virgin snow was almost blinding in its whiteness. We crossed the slope at an oblique angle which always trended upwards. Then we got on to the glacier, which was very steep, and the snow lay thickly upon it. We went straight up this, great masses of snow, disturbed by our feet, going tearing down into the unknown depths. The sun was extremely powerful, and the perspiration dripped from us. We conquered the glacier and crossed a level snow field. More laborious work; going straight up, until at last we gained some flat, rocky ground. The limestone rocks, exposed as they were to the full force of wind and sun, were bare of snow, and here we called a halt. We were soaked with perspiration, and our faces were scorched with the sun and glare from the snow to the hue of boiled lobsters. Seating ourselves on the rocks the bag was unpacked, the brandy produced, pipes filled, and then we looked around. We were on the crest of a ridge between our mountain and another lesser peak. On one side we looked down into the Flüela Pass and on the other into the Dischma Thal, which is terminated by the mighty mass of the Scaletta Glacier one of the finest in this part of Switzerland. In many places the ice was perfectly bare of snow, and we could see down into the yawning crevasses. Upwards, but far off yet, majestic and solitary in the golden light, was the black, riven peak of the Schwarzhorn. From where we sat the *arête* commenced and we knew that our real work yet lay before us. 'Gentlemen, we must start,' said our guide decisively when ten minutes had slipped away. So the bag was repacked, the ashes knocked from our pipes, and we were once more on the move. With a word of caution from the guide we got on the *arête*. On the right the treacherous snow slopes shelved at an angle of about 75 deg. On the left were dizzy precipices—literally vertical walls of rock, a

thousand feet or more in depth. It was no time to talk. We went steadily up until a narrow ledge of riven rocks was reached. We overcame this difficulty, and then before us, going straight up, was the thin edge of the *arête* that led to the ultimate peak. Half-an-hour of this toil, and then the guide grasped my hand and exclaimed :—

“ ‘ Hurrah ! *Wir haben es gethan !* ”

“ We had triumphed, and stood on the head of the Schwarzhorn—conquerors ! The crest is flat, but there is not much room up there. On three sides the shattered, splintered rocks go down sheer for 2000 feet, and I—notwithstanding that I am possessed of strong nerves—could scarcely repress a shudder as I stood on the very verge of the precipice and contemplated the result of a slip. On the fourth side was the *arête* up which we had come, and a precipitous *couloir* sloping down for 1000 feet to the glacier.

“ Gazing around, we beheld a panorama which is admitted to be one of the finest in the whole of Switzerland. The day was perfect even for this superb climate. Not a suspicion of a cloud, not the faintest sign of mist was anywhere visible, turn which way we would. I was dumb, entranced, amazed. A speck, an atom I felt myself to be, and yet with a soul panting to cry out in ecstasy of unutterable joy—of praise to the God of Nature who had created this wonderful scene. Range upon range, peak upon peak of snow-clad mountains stretched away to the glittering horizon. To the north the Bernese Oberland, to the east the great mass of Rheticon, the south the Tyrol and the Engadine, all giants, golden and dreamy in the burning light ; but mightier than they was the great Jura Range in the west. To the left we could count the four peaks of Monte Rosa, still more to the left the white dome of the Jungfrau glittered ; then we made out the Weisshorn, the Balmhorn, and a suggestion of the grim monster—the Matterhorn. Nearer to us was the great Ortler Spiz, the Tinnen-

horn, Piz d'Alea, Piz Michel, and the perpendicular walls of the Hoch Duccan. It was an inconceivably magnificent picture seen through a medium of the clearest atmosphere, and glittering in the most gorgeous golden light of a brilliant sun. To me it is a purifying memory—a dream of entrancing splendour that will last as long as life.

“When we had gazed in silent rapture, and taken our bearings by compass, had picked out and named dozens of peaks, we seated ourselves and proceeded to discuss our luncheon, for our work and the keen atmosphere on that airy height of nearly 11,000 feet had sharpened our appetites. From the hospice to the summit occupied us exactly three hours and forty minutes. Luncheon over, we again filled our pipes, and stretching ourselves on the hot rocks, we dreamed away nearly three-quarters of an hour. The fierce rays of the sun beat down scorchingly upon us, but we smoked and dreamed in spite of the heat. I studied every detail of the picture, took in every minute particular, burned it all into my brain as it were, so that I might never forget it. At ten minutes past two the guide said we must leave, for the sun was declining in the west, but I begged for a little while longer, which was granted. At the end of the time I would have still further prolonged the stay, for it was hard to tear oneself away from such a scene; but our guide was peremptory now and decisive. He was responsible for our safety, and so we prepared to go. The slanting shadows of the mountains told that the winter sun was getting low, and there was just a suspicion of chilliness in the air. In Switzerland in the winter the sudden change in the temperature as soon as the sun goes down is frequently as great as 50 degrees, and if your clothes are at all wet, they freeze to iron within five minutes. All being ready we started on our descent. Down the snowy *arête*, over the dangerous rocky passage, across the glaciers we went rapidly

and safely to the lower slopes. Then we stopped to breathe. It was getting very cold, but the dying sun was steeping the snow in fiery red. On again, traversing our tracks of the morning ; and as the gold, and amethyst, and crimson glory of the dying day trembled on the mountain tops, we stood once more at the hospice door. We changed our boots and stockings in the hostelry, had some boiled eggs and a huge bowl of hot spiced veltlina, and by that time our sledge was ready. The Flüela Pass is not considered particularly safe even in the daytime ; its dangers are enhanced at night. Swathed in our wraps, and lighting our cigars, we gave the order to start. The road was in very bad condition. The snow was worn into deep ruts by the heavy wine sleighs that come over from the Engadine, and we were soon made aware that our ten mile ride was not to be entirely free from peril, for we had not proceeded far when the sleigh got off the narrow track and literally hung over a precipice, but the driver dexterously jerked the horse round in the opposite direction, and so prevented what might have been an unpleasant mishap. On again, when suddenly one of the runners sank into a rut, over went the sleigh, my friend was shot over my head, I was under the sleigh, and the driver and the guide were pitched into a bank of snow. Fortunately the spot was level and the snow soft, and so we were none the worse for our spill. Half-a-mile further on precisely the same thing happened again, but with no more serious result. The stars were shining brilliantly, and the moon, which was full that night, was rising in regal magnificence. From the burning glory of the day we had passed to the silver glory of the night. The glowing colours called into being by the kingly sun were succeeded by the cold, glittering, argent splendour of the queenly moon. The snow sparkled in millions of flashing jewels as we glided along. There were stars above and stars below. The effect

was wonderful and entrancing. It was extremely cold, but being well protected with wraps we did not suffer much. The gorgeous magnificence of the night—which was almost unearthly in its witchery and beauty—was too fascinating for us to think of our personal comfort. Without further mishap, though with one or two wonderfully narrow escapes, we reached the hotel in time for table d'hôte, where we were warmly welcomed by our friends. We felt richer by the undying memory of a joyous day that had placed us face to face with Nature in her most entrancing grandeur; and possibly some slight degree of pardonable pride at the thought that we had conquered an Alpine monarch in spite of his grim barriers of winter, ice, and snow."

The eminent position which Dr Frankland, F.R.S., occupies as a scientific man gives peculiar value to his observations, and no apology, therefore, will be needed for inserting the following notes on Davos, which we take from the "Proceedings of the Royal Society," vol. xxii., page 317 :—

NOTES ON SOME WINTER THERMOMETRIC  
OBSERVATIONS IN THE ALPS,

BY

DR FRANKLAND, F.R.S.\*

... "The village (Davos) has of late acquired considerable repute as a climatic sanatorium for persons suffering from diseases of the chest. So rapidly has its reputation grown that while in the winter of 1865-66 only eight patients resided there, during the past season (1872) upwards of three hundred have wintered in the valley. The summer climate of Davos is very similar to that of Pontresina and St Moritz in the neighbouring high valley of the Engadine—cool and rather windy; but so soon as the Prättigau and surrounding mountains become thickly, and, for the

\* These observations were made in the valley of Davos by Dr Frankland, in the winter of 1873.

winter, permanently covered with snow, which usually happens in November, a new set of conditions come into play, and the winter climate becomes exceedingly remarkable. The sky is, as a rule, cloudless, or nearly so, and as the solar rays, though very powerful, are incompetent to melt the snow, they have very little effect upon the temperature either of the valley or its enclosing mountains; consequently there are no currents of heated air; and as the valley is well sheltered from more general atmospheric movements, an almost uniform calm prevails until the snow melts in spring. According to Dufour's trigonometrical measurements Davos is 5105 feet above the sea. The measurements of the Swiss Meteorological Society make the height 5413 feet, and my own estimation with an aneroid gave it as 4000 feet above Zurich, or 5352 feet above the sea. The village of Davos is therefore about 500 feet lower than the summit of the Rigi.\*

*December 21st, 1873.*—From behind the sharp peak of the Schwarzhorn, the sun rose at the Seehof Hotel Davos Dörfli at 8.35; at Davos Platz, it did not rise until 9.44. At 10 a.m. the mercurial thermometer with the blackened bulb *in Vacuo* showed 111.2° Fah. in the sunshine, and 113° Fah. at 2.50 p.m. At Greenwich the readings on this day with the blackened bulb *in Vacuo* placed on the grass in the sunshine were, at 9 a.m. 48.7° Fah.; at 3 p.m. 71.5° Fah.; the maximum for the day being 71.5° Fah.†

*December 22d.*—A mercurial thermometer with black glass bulb was laid on the snow at 8 a.m.; twenty minutes later, or 15 minutes before Sunrise, it marked —1° Fah. The sky was

\* More recent observations tend to prove Dr Frankland's measurement to be the correct one.—ED.

† The difference in the winter temperature of Davos and London is extraordinary. Mr Glaisher supplied Dr Frankland with the corresponding readings for Greenwich when the Doctor made his at Davos.—ED.

deep blue and almost perfectly cloudless the whole day. The following thermometrical observations were made on this day:—

I. BLACKENED BULB IN VACUO. IN SUNSHINE.

| A.M.    | A.M.   | A.M.   | A.M.     | A.M.     | A.M.     | A.M.     |          |
|---------|--------|--------|----------|----------|----------|----------|----------|
| 8'45    | 8'50   | 9'0    | 9'45     | 10'15    | 10'45    | 11'15    | Noon.    |
| 22°.C.* | 26°.C. | 30°.C. | 37'3".C. | 39'3".C. | 39'5".C. | 41'2".C. | 42'4".C. |

This thermometer was clamped to an alpenstock at a height of about five feet from the snow in all the observations.

At Greenwich on the same day the readings were with blackened bulb *in vacuo*:—Maximum, 12°.8 c. (55°·0° Fah.); at 9 A.M., 8°.5 c. (47°·3° Fah.); at noon, and at 3 P.M., 12°.8 c. (55°. F.)

The maximum *in the shade* was 10°.4 c. (50°·7° Fah.) and the minimum on the grass in the shade —1°.7 c. (28°·9° Fah.)

II. PLAIN MERCURIAL THERMOMETER WITH BLACK GLASS BULB.

IN SUNSHINE.

| A.M.   | A.M.    | A.M.    | Noon.   | P.M.    |
|--------|---------|---------|---------|---------|
| 9'45   | 10'15   | 11'15   |         | 1'45.   |
| —1°.C. | 0°.6 C. | 3°.3 C. | 3°.3 C. | 7°.2 C. |

III. PLAIN MERCURIAL THERMOMETER WITH BLACK BULB.

IN SHADE.

| A.M.    | A.M.    | Noon.   | P.M.    |
|---------|---------|---------|---------|
| 10'15   | 11'15   |         | 1'45    |
| —4°. C. | —1°. C. | —1°. C. | 2°.0 C. |

IV. PLAIN MERCURIAL THERMOMETER WITH BLACK GLASS BULB, PLACED IN A BOX LINED WITH PADDED BLACK-CLOTH, AND COVERED WITH PLATE GLASS A QUARTER OF AN INCH THICK.

| A.M.     | A.M.     | Noon.     | P.M.      | P.M.      |
|----------|----------|-----------|-----------|-----------|
| 9'45     | 10'15    | —         | 12'35     | 2'0       |
| 75°.0 C. | 85°.0 C. | 100°.0 C. | 102°.8 C. | 105°.0 C. |

Thus in mid-winter the concentrated solar rays at Davos are capable of producing, under favourable circumstances, a temperature of 221° Fah., or 9° Fah. above the boiling point of water at the sea level; or 21° Fah. above that point at Davos where I found water to boil at 200° Fah. when the barometer stood at 627·3 millimetres.

\* C.—Centigrade.

The highest temperature in sunshine which I have observed at Davos at noon with blackened bulb *in vacuo* was  $42^{\circ}.5$  c., which scarcely differs from that read on the Fluela Pass (24th December) at the same hour, viz.,  $42^{\circ}.3$  c.

At Greenwich on this day (24th December) with blackened bulb *in vacuo* at noon the maximum temperature was  $18^{\circ}.6$  c. ( $65^{\circ}.5$  c. Fah.) We have here a difference of as much as  $23^{\circ}.9$  c. between Davos and Greenwich for the same day and hour.

. . . The chief remarkable thing about the observations are, first, the very high sun temperatures prevailing contemporaneously with very low air, or shade temperature. And, secondly, the comparative uniformity of the solar heat from sunrise to sunset. Besides the intensity of solar radiation and its comparative uniformity during the day, the rarity and calmness of the air, is an important factors amongst the causes of the peculiar climate of Davos.

The following meteorological observations are for the winter seasons of 1879 to 1881 inclusive, commencing in October and ending in March of each year.

The instruments used were of the best possible description (Negretti, and Zambra, and Cosella.) They were verified at the new Observatory, and placed according to the regulations of the English Meteorological Society.

The greatest accuracy and care were observed in taking the observations, and they may, therefore, be looked upon as perfectly reliable.

*N.B.*—When wind is *not* mentioned an absolute calm is indicated.

The *force* of the wind unfortunately has not been observed owing to there being no reliable instrument for this purpose in the valley. We hope to be able to supply the omission in a future edition.

## OCTOBER 1879.

| Date. | Barom. | Max. | Min. | Solar.<br>Min. | Hygrometer. |      | REMARKS.                                                      |
|-------|--------|------|------|----------------|-------------|------|---------------------------------------------------------------|
|       |        |      |      |                |             |      |                                                               |
| 1     | 25 72  | 63 3 | 30 0 | 135 2          | 62 7        | 51 1 | Cloudless                                                     |
| 2     | 25 03  | 66 3 | 33 3 | 141 0          | 64 5        | 53 0 | Glorious forenoon; afternoon cloud and wind; evening clear    |
| 3     | 25 19  | 63 9 | 34 9 | 133 0          | 53 0        | 49 0 | Rain till 8 A.M., then bright sunshine; wind in the afternoon |
| 4     | 25 23  | 59 8 | 33 5 | 133 2          | 59 0        | 49 0 | Glorious, light clouds from 5 P.M.                            |
| 5     | 25 21  | 62 0 | 31 0 | 138 0          | 60 5        | 50 1 | Cloudless                                                     |
| 6     | 25 22  | 62 8 | 32 2 | 135 0          | 60 0        | 49 5 | Cloudless                                                     |
| 7     | 25 22  | 58 3 | 31 2 | 128 2          | 57 0        | 48 0 | Cloudless                                                     |
| 8     | 25 26  | 60 5 | 31 0 | 130 0          | 60 8        | 49 0 | Cloudless; mist after sunset                                  |
| 9     | 25 22  | 59 0 | 30 5 | 132 5          | 58 5        | 47 2 | Cloudless                                                     |
| 10    | 25 26  | 59 5 | 29 8 | 131 0          | 58 0        | 47 5 | Cloudless                                                     |
| 11    | 25 26  | 59 5 | 29 8 | 129 0          | 51 0        | 43 0 | Splendid forenoon; from 2 P.M. cloudy and some wind           |
| 12    | 25 33  | 58 1 | 29 8 | 128 0          | 57 0        | 45 0 | Cloudless                                                     |
| 13    | 25 15  | 64 0 | 27 9 | 140 0          | 53 8        | 48 0 | Cloudless                                                     |
| 14    | 25 13  | 64 0 | 29 3 | 140 0          | 64 0        | 46 5 | Cloudless                                                     |
| 15    | 24 88  | 44 2 | 28 2 | 75 0           | 44 0        | 44 0 | Grey morning, then a little sun; rain at 5 P.M.; snow after   |
| 16    | 24 72  | 29 8 | 26 3 | 50 0           | 26 5        | 26 5 | Snow all day and some wind. Valley white                      |
| 17    | 24 90  | 35 0 | 21 9 | 119 0          | 29 5        | 26 2 | A good deal of sunshine; some wind                            |
| 18    | 24 80  | 40 2 | 18 8 | 50 0           | 32 5        | 32 5 | Snow most of the day; some wind                               |
| 19    | 25 03  | 51 9 | 15 0 | 138 5          | 37 0        | 35 0 | Some hours of snow; little sun                                |
| 20    | 24 73  | 51 0 | 34 1 | 106 0          | 50 5        | 45 0 | Little sun, some rain early; snow going fast                  |
| 21    | 24 77  | 35 0 | 29 9 | 120 0          | 34 5        | 32 2 | Glorious; some streaks of cirrus                              |
| 22    | 24 94  | 40 2 | 25 1 | 143 0          | 35 5        | 32 6 | Snow and wind                                                 |
| 23    | 25 00  | 53 4 | 15 3 | 125 0          | 40 0        | 34 0 | Cloudless                                                     |
| 24    | 24 94  | 53 0 | 18 1 | 128 0          | 50 3        | 43 2 | Cloudless                                                     |
| 25    | 24 84  | 46 0 | 24 5 | 126 0          | 47 5        | 40 5 | Cloudless                                                     |
| 26    | 24 98  | 51 5 | 25 8 | 126 0          | 43 0        | 39 0 | Glorious; a few clouds visible                                |
| 27    | 25 10  | 53 0 | 24 5 | 128 0          | 53 0        | 43 0 | Cloudless                                                     |
| 28    | 25 08  | 53 7 | 25 0 | 123 0          | 37 0        | 33 0 | Cloudless                                                     |
| 29    | 25 07  | 58 4 | 28 0 | 128 3          | 55 2        | 43 0 | Cloudless                                                     |
| 30    | 25 07  | 56 0 | 28 1 | 130 0          | 54 7        | 42 4 | Cloudless                                                     |
| 31    | 24 98  | 54 0 | 29 3 | 121 5          | 53 5        | 43 0 | Cloudless                                                     |

NOVEMBER 1879.

| Date. | Barom. | Max. | Min. | Solar.<br>Max. | Hygrometer. |      | REMARKS.                                                      |
|-------|--------|------|------|----------------|-------------|------|---------------------------------------------------------------|
| 1     | 24 88  | 53 5 | 36 0 | 126 0          | 53 0        | 48 0 | Cloudy, forenoon rainy; sun in afternoon. Some wind           |
| 2     | 24 73  | 44 0 | 28 5 | 125 0          | 43 3        | 38 0 | Cloudy forenoon; afternoon snow, slight wind                  |
| 3     | 24 88  | 45 0 | 20 1 | 124 0          | 45 0        | 43 0 | Cloudy, a little wind                                         |
| 4     | 25 22  | 30 5 | 12 0 | 90 0           | 23 0        | 22 0 | Clouds and sunshine alternately                               |
| 5     | 25 27  | 38 5 | 12 9 | 118 0          | 32 2        | 26 4 | Cloudless                                                     |
| 6     | 25 19  | 37 2 | 15 0 | 121 0          | 33 9        | 32 2 | Sunny forenoon; afternoon cloudy, a little wind; evening snow |
| 7     | 25 11  | 33 0 | 25 1 | 54 2           | 32 0        | 29 2 | Snow all day; a heavy fall                                    |
| 8     | 25 33  | 36 2 | 7 1  | 143 5          | 34 2        | 32 2 | Cloudless                                                     |
| 9     | 25 32  | 43 5 | 13 2 | 147 8          | 43 0        | 37 0 | Cloudless                                                     |
| 10    | 25 20  | 47 2 | 18 2 | 146 0          | 43 5        | 38 0 | Cloudless                                                     |
| 11    | 25 07  | 38 8 | 17 4 | 115 0          | 36 0        | 32 2 | Brilliant sunshine; some white clouds                         |
| 12    | 24 74  | 34 2 | 18 0 | 117 0          | 33 5        | 32 5 | Sunny morning; 12 A.M. snow; heavy snow in evening            |
| 13    | 24 80  | 23 6 | 18 3 | 70 2           | 18 8        | 18 0 | Snow showers at intervals all day; a little wind              |
| 14    | 24 85  | 24 3 | 12 2 | 125 0          | 23 1        | 21 3 | Slight snowfall all day                                       |
| 15    | 24 94  | 16 0 | 8 5  | 96 0           | 14 0        | 14 0 | Cloudy; cold wind                                             |
| 16    | 25 03  | 24 0 | 1 5  | 61 0           | 13 5        | 13 5 | Snow all day                                                  |
| 17    | 25 00  | 24 0 | 10 9 | 54 0           | 23 0        | 23 0 | Snow at intervals all day                                     |
| 18    | 24 95  | 31 5 | 21 2 | 60 0           | 30 5        | 30 5 | Forenoon sunny; snow from 2 P.M.; wind from 4 P.M.            |
| 19    | 24 83  | 32 1 | 20 5 | 148 0          | 26 0        | 25 8 | Forenoon snow, 3 hours wind; afternoon cloudy                 |
| 20    | 24 67  | 21 9 | 16 0 | 70 0           | 25 8        | 25 8 | Cloudy                                                        |
| 21    | 25 10  | 43 5 | 25 0 | 126 0          | 42 5        | 39 0 | Cloudy                                                        |
| 22    | 25 30  | 44 0 | 31 9 | 75 0           | 42 5        | 38 2 | Some hours sunshine, otherwise cloudy; very little wind       |
| 23    | 24 90  | 47 1 | 31 9 | 146 0          | 41 0        | 39 0 | Rain from 7 till 8 A.M., then snow till 5 P.M.                |
| 24    | 24 85  | 34 3 | 33 4 | 57 0           | 32 1        | 32 0 | Two hours of sunshine, otherwise cloudy                       |
| 25    | 24 90  | 29 7 | 20 8 | 111 0          | 28 0        | 27 0 | Cloudy; two or three snow showers                             |
| 26    | 24 67  | 23 7 | 8 0  | 105 0          | 20 0        | 20 0 | Cloudless                                                     |
| 27    | 24 68  | 23 8 | 1 0  | 120 0          | 15 5        | 15 5 | Very fine, but sun clouded now and then                       |
| 28    | 24 60  | 24 0 | 1 3  | 125 0          | 18 0        | 18 0 | Splendid, but once or twice light clouds obscured the sun     |
| 29    | 24 59  | 33 5 | 4 5  | 136 0          | 29 5        | 26 0 | Cloudy; puffs of wind now and then                            |
| 30    | 24 39  | 19 7 | 6 7  | 41 0           | 10 0        | 10 0 |                                                               |

## DECEMBER 1879.

| Date. | Barom. | Max.  | Min.  | Soar.<br>Max. | Hygrometer. | REMARKS.                                                    |
|-------|--------|-------|-------|---------------|-------------|-------------------------------------------------------------|
| 1     | 24.40  | 14.3  | 1.5   | 46.3          | 13.0        | Cloudy, some snow showers, and some wind                    |
| 2     | 24.57  | 10.25 | 3.0   | 43.5          | 9.0         | Cloudy, some snow showers, and a little wind                |
| 3     | 24.70  | 18.2  | -9.5  | 99.0          | 17.0        | Cloudless till 12 A.M.; afternoon grey                      |
| 4     | 24.56  | 34.0  | 13.0  | 117.0         | 28.2        | Sun till 10.30 A.M.; cloudy; afternoon 2 hours bright sun   |
| 5     | 24.39  | 34.0  | 25.5  | 71.2          | 27.2        | Cloudless till 7 A.M.; south wind till 12, afternoon snow   |
| 6     | 24.60  | 21.0  | 3.75  | 78.0          | 20.0        | Cloudy, now and then a little sun, snow in the afternoon    |
| 7     | 25.70  | 16.75 | 1.50  | 98.5          | 15.0        | Sunny, but sun obscured at times by clouds; a little wind   |
| 8     | 25.05  | 15.30 | -14.0 | 110.0         | 3.0         | Splendid, but white clouds visible                          |
| 9     | 25.00  | 12.30 | -16.7 | 99.0          | — 5         | Cloudless                                                   |
| 10    | 25.12  | 18.5  | -14.7 | 122.5         | 10.0        | Cloudless till 2 P.M., then one or two white clouds visible |
| 11    | 25.15  | 19.5  | -8.0  | 118.0         | 18.0        | Cloudless                                                   |
| 12    | 25.18  | 21.0  | -6.1  | 52.5          | 19.0        | Cloudy; snow (light fall) most of day; wind in afternoon    |
| 13    | 25.21  | 20.0  | 10.25 | 119.5         | 8.5         | Grey till 10 A.M.; sunshine, now and then obscured          |
| 14    | 25.20  | 17.25 | 9.75  | 120.0         | 11.2        | Cloudless                                                   |
| 15    | 25.12  | 18.25 | -7.0  | 130.5         | 12.2        | Cloudless                                                   |
| 16    | 25.25  | 32.5  | -3.0  | 121.5         | 30.0        | Cloudless                                                   |
| 17    | 25.00  | 34.5  | 3.0   | 125.5         | 33.0        | Cloudless                                                   |
| 18    | 25.05  | 35.0  | 8.7   | 128.0         | 36.0        | White clouds till 1 P.M., then cloudless                    |
| 19    | 25.19  | 39.5  | 9.0   | 120.0         | 35.5        | Cloudless                                                   |
| 20    | 25.31  | 39.25 | 14.0  | 132.0         | 34.5        | Cloudless                                                   |
| 21    | 25.30  | 39.5  | 14.3  | 123.0         | 31.5        | Cloudless                                                   |
| 22    | 25.45  | 37.0  | 13.85 | 129.0         | 36.0        | Cloudless                                                   |
| 23    | 25.51  | 39.5  | 12.25 | 132.0         | 37.0        | Some white clouds till 10 A.M., then cloudless              |
| 24    | 25.40  | 37.75 | 14.0  | 127.5         | 27.5        | Cloudless                                                   |
| 25    | 25.33  | 37.70 | 12.0  | 127.5         | 30.0        | Cloudless                                                   |
| 26    | 25.30  | 39.75 | 11.33 | 127.0         | 33.0        | Cloudless                                                   |
| 27    | 25.28  | 36.0  | 12.0  | 127.0         | 32.1        | Cloudless                                                   |
| 28    | 25.38  | 35.0  | 10.5  | 124.0         | 31.2        | Splendid; white clouds now and then obscured the sun        |
| 29    | 25.24  | 39.5  | 13.25 | 106.0         | 38.5        | Cloudy, a little sun                                        |
| 30    | 25.09  | 38.5  | 23.5  | 138.0         | 37.0        | Sunshine, but not brilliant, till 12 A.M., then cloudy      |
| 31    | 25.10  | 34.5  | 12.0  | 51.0          | 33.6        | Snow, but not heavy, all day                                |

JANUARY 1880.

| Date. | Barom. | Max.  | Min.  | Solar.<br>Max. | Hygrometer. | REMARKS. |                                                             |
|-------|--------|-------|-------|----------------|-------------|----------|-------------------------------------------------------------|
| 1     | 25.27  | 35.7  | 22.0  | 62.5           | 35.0        | 34.0     | Snow all day                                                |
| 2     | 25.28  | 38.5  | 28.3  | 131.0          | 29.5        | 28.0     | Cloudy till 12 A.M.; brilliant for remainder of the day     |
| 3     | 25.29  | 39.7  | 9.0   | 142.0          | 35.0        | 30.0     | Almost cloudless till 12 A.M., after which a little cloudy  |
| 4     | 25.32  | 35.5  | 6.0   | 130.0          | 33.0        | 28.0     | Glorious; one or two streaks of cirrus                      |
| 5     | 25.27  | 39.7  | 10.3  | 133.5          | 35.1        | 30.0     | Cloudless till 12 A.M.; afternoon somewhat cloudy           |
| 6     | 25.30  | 38.3  | 10.0  | 134.0          | 35.75       | 29.25    | Cloudless                                                   |
| 7     | 25.34  | 39.3  | 12.0  | 135.0          | 35.0        | 31.3     | Cloudless                                                   |
| 8     | 25.27  | 31.75 | 9.6   | 133.5          | 31.5        | 28.25    | Cloudless                                                   |
| 9     | 25.20  | 37.5  | 9.0   | 132.0          | 33.25       | 27.75    | Cloudless                                                   |
| 10    | 25.20  | 35.25 | 9.6   | 129.7          | 30.3        | 25.5     | Cloudless                                                   |
| 11    | 25.21  | 34.75 | 8.7   | 130.0          | 32.5        | 27.0     | Cloudless                                                   |
| 12    | 25.23  | 28.5  | 5.0   | 129.0          | 29.25       | 24.25    | Cloudless                                                   |
| 13    | 25.25  | 30.0  | 5.0   | 133.5          | 29.25       | 24.0     | Cloudless                                                   |
| 14    | 25.20  | 39.7  | 5.75  | 138.0          | 27.25       | 22.0     | Splendid, but a little cloudy till 12 A.M.; slight wind     |
| 15    | 25.18  | 22.5  | 12.25 | 111.5          | 20.0        | 18.25    | Snow all day—never heavy; some gleams of sunshine           |
| 16    | 25.00  | 21.5  | 7.5   | 124.0          | 15.25       | 14.0     | Cloudy till 3 P.M. and some snow, then brilliant sunshine   |
| 17    | 24.77  | 20.5  | 1.5   | 46.5           | 20.25       | 19.25    | Snow most of the day                                        |
| 18    | 24.72  | 22.5  | 14.5  | 62.5           | 21.0        | 19.0     | Light snowfall most of the day                              |
| 19    | 24.86  | 20.0  | -5.5  | 130.0          | 18.8        | 16.25    | Brilliant sunshine, but never absolutely cloudless          |
| 20    | 25.02  | 20.0  | -12.5 | 122.5          | 18.0        | 15.0     | Cloudless                                                   |
| 21    | 25.13  | 18.75 | -10.0 | 50.0           | 17.5        | 17.0     | Cloudy                                                      |
| 22    | 25.03  | 25.25 | -5.5  | 141.0          | 20.0        | 16.25    | Brilliant sunshine, but white clouds on horizon till 1 P.M. |
| 23    | 24.93  | 20.0  | -5.75 | 125.0          | 20.0        | 16.25    | Cloudless                                                   |
| 24    | 25.06  | 28.75 | -2.5  | 130.5          | 23.0        | 19.0     | Cloudless                                                   |
| 25    | 24.99  | 35.7  | -1.25 | 137.0          | 30.7        | 25.0     | Cloudless                                                   |
| 26    | 25.04  | 36.75 | -4.5  | 136.0          | 30.0        | 23.7     | Cloudless                                                   |
| 27    | 25.07  | 37.7  | 6.75  | 135.5          | 34.5        | 29.0     | Cloudless                                                   |
| 28    | 25.17  | 39.3  | 8.3   | 133.5          | 38.0        | 30.0     | Cloudless                                                   |
| 29    | 25.22  | 42.0  | 14.0  | 134.5          | 41.5        | 35.0     | Glorious; some streaks of cirrus                            |
| 30    | 25.23  | 47.75 | 15.5  | 150.5          | 40.2        | 31.5     | Glorious, but sun once or twice veiled by streaks of cirrus |
| 31    | 25.26  | 40.0  | 16.0  | 119.7          | 36.25       | 31.25    | Glorious, but sun once or twice slightly veiled by cirrus   |

## F E B R U A R Y 1880.

| Date. | Barom. | Max.  | Min.  | Solar<br>Max. | Hygrometer. |       | REMARKS.                                                    |
|-------|--------|-------|-------|---------------|-------------|-------|-------------------------------------------------------------|
| 1     | 25.26  | 43.0  | 15.5  | 131.5         | 38.0        | 31.6  | Glorious, a few white clouds                                |
| 2     | 25.27  | 43.7  | 15.3  | 130.0         | 38.25       | 32.25 | Cloudless                                                   |
| 3     | 25.22  | 42.0  | 14.0  | 129.5         | 38.3        | 32.25 | Cloudless                                                   |
| 4     | 25.23  | 42.3  | 14.3  | 129.5         | 39.5        | 32.5  | Cloudless                                                   |
| 5     | 25.12  | 42.6  | 13.3  | 129.7         | 36.75       | 32.0  | Cloudless                                                   |
| 6     | 25.05  | 39.5  | 9.7   | 121.0         | 35.0        | 30.5  | Cloudless                                                   |
| 7     | 24.98  | 43.0  | 13.0  | 128.5         | 36.25       | 32.25 | Cloudless till 12 A.M.; afternoon grey                      |
| 8     | 24.80  | 41.8  | 11.3  | 127.0         | 35.5        | 32.0  | Glorious; some streaks of cirrus in the south               |
| 9     | 24.83  | 38.75 | 8.3   | 125.5         | 35.0        | 28.0  | Three hours of sunshine before 12 A.M.; otherwise cloudy    |
| 10    | 24.72  | 37.2  | 16.0  | 64.5          | 35.5        | 32.25 | Sunshine and clouds alternately                             |
| 11    | 24.69  | 32.5  | 26.3  | 134.0         | 37.0        | 35.0  | Glorious till 12 A.M.; afternoon little sun and slight wind |
| 12    | 24.93  | 38.0  | 20.0  | 131.5         | 34.25       | 32.25 | Cloudy all day and frequent snow showers; slight wind       |
| 13    | 25.03  | 28.5  | 19.2  | 114.5         | 27.0        | 26.25 | Cloudless                                                   |
| 14    | 24.99  | 37.0  | 10.5  | 132.25        | 35.0        | 29.25 | Glorious, but cirrus sometimes veiled the sun               |
| 15    | 24.98  | 44.5  | 9.0   | 129.0         | 31.5        | 30.25 | Glorious, now and then cirrus veiled the sun                |
| 16    | 24.76  | 45.25 | 11.5  | 126.5         | 39.5        | 31.15 | Sunshine before 12; and one hour after 1; otherwise grey    |
| 17    | 24.74  | 44.5  | 25.0  | 123.5         | 42.5        | 36.0  | Two inches of snow before 1 P.M.; afternoon cloudy          |
| 18    | 24.72  | 33.5  | 31.25 | 126.0         | 32.0        | 28.5  | Glorious, but white clouds sometimes obscured the sun       |
| 19    | 24.99  | 43.0  | 17.0  | 128.0         | 40.0        | 34.0  | Sun till 12 A.M.; afternoon cloudy with a little sunshine   |
| 20    | 24.93  | 43.5  | 17.7  | 131.25        | 42.0        | 34.0  | Sunshine till 2 P.M.; clouded for an hour, then sunny       |
| 21    | 24.98  | 46.25 | 7.5   | 68.0          | 42.25       | 33.3  | Snow all day and all night—8 inches                         |
| 22    | 24.85  | 46.25 | 9.0   | 59.0          | 34.5        | 32.75 | Snow all day; two inches fell in the night                  |
| 23    | 24.67  | 31.5  | 18.8  | 91.0          | 29.8        | 28.75 | Snow till 2 P.M.; some sun in the afternoon                 |
| 24    | 24.73  | 35.0  | 23.0  | 141.0         | 34.3        | 33.0  | Glorious, but some white clouds visible                     |
| 25    | 25.06  | 37.5  | 23.0  | 142.5         | 34.0        | 29.5  | Cloudless till 1 P.M.; grey from 3 P.M.; a little wind      |
| 26    | 24.99  | 40.2  | 4.5   | 122.0         | 37.0        | 32.3  | Sunshine and snow alternately; after 12 A.M. a little wind  |
| 27    | 24.74  | 30.0  | 7.7   | 139.0         | 28.5        | 25.25 | Cloudless till 12 A.M.; from 3 P.M. grey and a little wind  |
| 28    | 24.76  | 35.25 | 9.5   | 121.0         | 34.0        | 28.25 | Cloudless                                                   |
| 29    | 24.87  | 43.25 | 15.0  | 139.5         | 41.0        | 35.25 | Cloudless                                                   |

MARCH 1880.

| Date. | Barom. | Max.  | Min.  | Solar<br>Max. | Hygrometer. |       | REMARKS.                                                     |
|-------|--------|-------|-------|---------------|-------------|-------|--------------------------------------------------------------|
| 1     | 24.82  | 46.8  | 15.0  | 138.75        | 46.5        | 37.25 | Cloudless                                                    |
| 2     | 24.90  | 45.0  | 9.5   | 129.3         | 40.0        | 33.25 | Cloudless                                                    |
| 3     | 24.93  | 43.5  | 13.0  | 128.5         | 42.5        | 36.0  | Brilliant sunshine; white clouds visible; 3 hours of wind    |
| 4     | 24.93  | 41.6  | 25.0  | 76.0          | 41.2        | 39.0  | Snow from 8 A.M. till 10 A.M.; then rain all day; wind       |
| 5     | 25.14  | 48.0  | 32.25 | 145.0         | 47.5        | 42.25 | Sunshine and cloud alternately till 3 P.M., then quite grey  |
| 6     | 25.22  | 52.2  | 32.5  | 138.0         | 52.0        | 36.5  | Cloudless                                                    |
| 7     | 25.18  | 55.25 | 27.8  | 140.0         | 53.0        | 42.5  | Cloudless                                                    |
| 8     | 25.22  | 59.0  | 25.25 | 136.5         | 51.5        | 42.0  | Cloudless                                                    |
| 9     | 25.30  | 52.5  | 28.2  | 136.5         | 51.5        | 42.5  | Cloudless                                                    |
| 10    | 25.28  | 53.0  | 24.3  | 135.0         | 51.25       | 42.25 | Cloudless                                                    |
| 11    | 25.29  | 54.75 | 23.5  | 136.75        | 53.5        | 42.5  | Cloudless                                                    |
| 12    | 25.27  | 54.5  | 24.0  | 136.0         | 50.5        | 42.3  | Cloudless                                                    |
| 13    | 25.18  | 54.5  | 23.5  | 134.0         | 49.6        | 38.3  | Cloudless                                                    |
| 14    | 25.14  | 50.25 | 18.3  | 135.0         | 47.0        | 34.25 | Cloudless till 4 P.M.; 8 P.M. clouded; 2 P.M. light breeze   |
| 15    | 25.06  | 41.3  | 27.2  | 92.0          | 40.0        | 37.0  | Light snow fall, then cloud and sun; after 2 P.M. brilliant  |
| 16    | 25.01  | 42.0  | 20.0  | 117.5         | 41.5        | 34.5  | Sunshine and clouds till 2 P.M.; snow and wind after         |
| 17    | 24.92  | 35.6  | 32.0  | 83.5          | 35.0        | 33.0  | Snow from 8 A.M. till 2 P.M.; afternoon cloudy, with gleams  |
| 18    | 25.07  | 42.8  | 12.3  | 139.0         | 40.0        | 32.5  | Cloudless                                                    |
| 19    | 25.08  | 45.0  | 10.0  | 125.25        | 42.0        | 33.0  | Cloudless                                                    |
| 20    | 25.25  | 44.9  | 15.0  | 128.5         | 44.75       | 32.25 | Cloudless till 1 P.M.; a little wind from 12 A.M.            |
| 21    | 24.90  | 45.75 | 14.3  | 130.0         | 42.0        | 33.0  | Cloudless; a little wind from 1 P.M. till sunset             |
| 22    | 24.89  | 39.0  | 10.0  | 122.5         | 37.0        | 31.6  | Cloudless till 10 A.M., then white clouds visible; cold wind |
| 23    | 25.07  | 43.0  | 11.0  | 125.0         | 40.0        | 33.0  | Cloudless                                                    |
| 24    | 25.12  | 49.75 | 11.6  | 135.0         | 49.0        | 37.3  | Cloudless                                                    |
| 25    | 25.07  | 50.25 | 15.0  | 135.5         | 49.5        | 38.5  | Cloudless till 12 A.M.; afternoon sun and clouds alternately |
| 26    | 24.98  | 53.5  | 19.25 | 142.5         | 46.0        | 37.0  | Snow between 7 and 8 A.M. sunshine and wind from 2 P.M.      |
| 27    | 24.95  | 51.75 | 25.0  | 139.0         | 51.0        | 41.0  | Cloudless till 2 P.M.; after 3 sun and clouds; slight wind   |
| 28    | 24.98  | 53.5  | 21.0  | 143.5         | 45.0        | 35.0  | Bright sun; but horizon never cloudless                      |
| 29    | 24.95  | 49.0  | 21.0  | 124.5         | 44.0        | 35.5  | Sunshine and clouds alternately; snow at 6 P.M.              |
| 30    | 24.82  | 51.0  | 28.5  | 139.5         | 44.0        | 36.0  | Snow and sunshine alternately till 2 P.M.; sunny afternoon   |
| 31    | 24.78  | 51.5  | 21.0  | 113.0         | 33.0        | 32.0  |                                                              |

## OCTOBER 1880.

| Date. | Barom. | Max.  | Min.  | Solar Max. | Hygrometer. |    | Wind.  |                 | REMARKS.                                     |
|-------|--------|-------|-------|------------|-------------|----|--------|-----------------|----------------------------------------------|
|       |        |       |       |            |             |    | Up.    | Cur. Val. Wind. |                                              |
| 1     | 25 26  | 67 75 | 29 25 | 143 0      | 61          | 75 | N.     | *O.             | Cloudless                                    |
| 2     | 25 07  | 65 25 | 31 33 | 143 0      | 65          | 0  | O.     | N.              | Cloudless                                    |
| 3     | 24 86  | 47 33 | 32 33 | 110 0      | 47          | 0  | W.N.W. | N.              | Cloudy, with gleams of sunshine              |
| 4     | 24 88  | 57 33 | 40 5  | 122 0      | 52          | 0  | W.     | O.              | Cloudy, with gleams of sunshine              |
| 5     | 24 97  | 59 75 | 42 25 | 93 0       | 56          | 5  | S.     | O.              | Cloudy, with gleams of sunshine              |
| 6     | 24 96  | 62 0  | 45 33 | 103 0      | 60          | 5  | S.S.W. | S.              | Cloudy, with gleams of sunshine              |
| 7     | 24 95  | 75 0  | 53 0  | 101 0      | 61          | 0  | S.     | O.              | Sunshine occasionally obscured by clouds     |
| 8     | 24 83  | 61 5  | 44 0  | 123 5      | 57          | 0  | S.     | O.              | Sun till noon; af'n'n cloudy; after 4 rain   |
| 9     | 24 81  | 47 0  | 25 2  | 122 5      | 45          | 0  | O.     | O.              | Cloudless                                    |
| 10    | 24 7   | 42 8  | 29 0  | 136 0      | 37          | 5  | S.W.   | O.              | Sunshine and cloudy alternately              |
| 11    | 24 85  | 49 0  | 25 2  | 114 0      | 43          | 0  | S.     | O.              | Sunshine all day                             |
| 12    | 24 9   | 43 25 | 35 0  | 100 5      | 42          | 0  | S.     | O.              | Sun till 2; cloudy; soft snow nearly all day |
| 13    | 24 96  | 43 2  | 28 0  | 124 5      | 43          | 0  | W.     | O.              | Sunshine till 2; cloudy; rain in evening     |
| 14    | 25 07  | 49 5  | 32 5  | 135 0      | 39          | 5  | W.     | N.              | Sunshine and clouds alternately              |
| 15    | 25 05  | 58 25 | 23 5  | 134 5      | 55          | 5  | W.     | O.              | Cloudless                                    |
| 16    | 25 04  | 50 0  | 32 5  | 123 5      | 53          | 25 | W.N.W. | O.              | Sunshine till 2 P.M.; then cloudy            |
| 17    | 25 04  | 57 0  | 31 0  | 128 5      | 51          | 25 | S.W.   | O.              | Sunshine till 11; cloudy in afternoon        |
| 18    | 24 98  | 50 5  | 38 0  | 84 5       | 50          | 5  | S.     | O.              | Cloudy, with intermittent sunshine           |
| 19    | 24 98  | 53 0  | 41 66 | 136 5      | 48          | 66 | S.     | S.              | Cloudy till 11; sun till 3.45; ev'n'g misty  |
| 20    | 24 74  | 52 2  | 37 33 | 135 0      | 52          | 0  | S.     | S. & N.         | Bright sun till 2 P.M.; then cloudy          |
| 21    | 24 8   | 54 25 | 39 5  | 75 0       | 50          | 5  | S.     | N.              | Cloudy, with occasional sunshine             |
| 22    | 24 7   | 55 8  | 41 5  | 61 5       | 55          | 0  | S.W.   | O.              | Cloudy, partial gleams; rain at night        |
| 23    | 24 83  | 55 33 | 41 0  | 134 0      | 54          | 66 | W.     | N.              | Cloudy; occasional sunshine                  |
| 24    | 24 87  | 37 25 | 34 0  | 93 0       | 36          | 0  | W.     | N.              | Snow showers till 11 A.M.; then cloudy       |
| 25    | 24 97  | 41 25 | 26 2  | 124 0      | 39          | 0  | W.     | N.              | Cloudless                                    |
| 26    | 24 87  | 51 8  | 19 35 | 123 5      | 48          | 25 | W.     | O.              | Cloudless till 2 P.M.; afterwards cloudy     |
| 27    | 24 82  | 54 75 | 29 25 | 94 0       | 52          | 5  | S.     | N.              | Cloudy with gleams; after 8 P.M. rain        |
| 28    | 24 74  | 54 5  | 42 0  | 128 0      | 53          | 75 | S.     | O.              | Sunshine till 1.30 P.M.; afternoon cloudy    |
| 29    | 24 53  | 50 75 | 40 35 | 93 0       | 46          | 66 | S.     | N.              | Cloudless till 10; then cloudy; af'n'n rainy |
| 30    | 24 77  | 34 0  | 24 0  | 89 5       | 31          | 5  | W.     | S.              | Sunshine till 12; cloudy after, and snow     |
| 31    | 24 94  | 38 5  | 25 5  | 122 0      | 38          | 5  | O.     | O.              | Cloudless                                    |

\* "O" here indicates "no wind."

NOVEMBER 1880.

| Date. | Barom. | Max.  | Min.  | Solar Max. | Hygrometer. |       | Wind.    |            | Remarks.                                    |
|-------|--------|-------|-------|------------|-------------|-------|----------|------------|---------------------------------------------|
|       |        |       |       |            |             |       | Up. Cur. | Val. Wind. |                                             |
| 1     | 25 00  | 33 0  | 13 8  | 112 0      | 33 0        | 27 25 | O.       | N.E.       | Cloudless                                   |
| 2     | 24 90  | 38 0  | 19 0  | 87 0       | 36 66       |       | O.       | O.         | Sunshine all day                            |
| 3     | 24 78  | 35 5  | 28 0  | 81 0       | 33 0        | 29 0  | O.       | O.         | Cloudy, with gleams of sunshine             |
| 4     | 24 73  | 43 0  | 31 0  | 120 0      | 42 33       | 36 0  | S.       | O.         | Sunshine till 2.30 P.M.; afterwards cloudy  |
| 5     | 24 86  | 37 5  | 28 0  | 117 2      | 35 5        | 32 0  | S.       | O.         | Sunshine till 11.30 A.M.; clouds & snow     |
| 6     | 25 07  | 40 0  | 27 0  | 119 0      | 38 0        | 35 0  | N.W.     | O.         | Cloudless                                   |
| 7     | 25 12  | 50 0  | 21 0  | 124 5      | 46 25       | 36 0  | O.       | O.         | Cloudless                                   |
| 8     | 25 07  | 50 2  | 27 5  | 105 0      | 42 25       | 36 0  | O.       | O.         | Sunshine till 11 A.M.; clouds; showery      |
| 9     | 24 97  | 50 2  | 26 33 | 122 0      | 48 5        | 44 66 | S.W.     | O.         | Clouds and sunshine alternately             |
| 10    | 24 94  | 37 2  | 26 5  | 86 0       | 30 0        | 35 0  | W.       | O.         | Cloudy; 2 hours mist in valley after 3 P.M. |
| 11    | 24 95  | 46 5  | 20 25 | 117 5      | 45 0        | 36 0  | O.       | O.         | Cloudless                                   |
| 12    | 24 99  | 45 0  | 21 75 | 114 0      | 44 25       | 37 0  | O.       | O.         | Cloudless                                   |
| 13    | 24 95  | 54 25 | 20 0  | 70 0       | 43 0        | 39 5  | S.       | N.         | Cloudy; gleams till 1 P.M., then wet        |
| 14    | 24 95  | 53 33 | 20 0  | 122 0      | 53 0        | 41 0  | W.       | O.         | Cloudless                                   |
| 15    | 24 75  | 48 75 | 27 2  | 122 5      | 48 0        | 38 33 | S.W.     | N.         | Sunshine till 1.30, then cloudy             |
| 16    | 24 77  | 48 2  | 26 0  | 100 0      | 47 5        | 37 5  | S.       | N.         | Sunshine till 10.30 A.M., then cloudy       |
| 17    | 24 39  | 39 0  | 32 0  | 46 0       | 38 0        | 35 0  | O.       | N.         | Rain, then sleet; after 2 P.M. snow         |
| 18    | 24 42  | 38 0  | 25 2  | 136 5      | 34 0        | 28 33 | N.       | S.         | Cloudless                                   |
| 19    | 24 48  | 41 75 | 12 2  | 94 5       | 39 0        | 36 0  | S.       | S.         | Snow early; sunshine; then cloudy           |
| 20    | 24 77  | 41 25 | 25 0  | 135 5      | 37 0        | 33 75 | S.       | O.         | Cloudless till 5 P.M.; evening cloudy       |
| 21    | 24 88  | 40 33 | 23 0  | 139 0      | 38 0        | 33 0  | S.       | O.         | Cloudless till 2.45 P.M.; then cloudy       |
| 22    | 24 80  | 40 66 | 27 0  | 123 0      | 38 0        | 36 25 | S.       | O.         | Clouds and sunshine alternately             |
| 23    | 24 4   | 38 5  | 17 25 | 124 5      | 38 0        | 32 5  | S.       | O.         | Sunshine all day                            |
| 24    | 25 14  | 41 66 | 17 5  | 118 0      | 39 5        | 34 5  | O.       | O.         | Cloudless                                   |
| 25    | 25 16  | 43 5  | 20 25 | 106 0      | 40 0        | 36 0  | S.       | O.         | Sunshine all day                            |
| 26    | 25 0   | 48 75 | 25 25 | 129 0      | 42 0        | 37 0  | S.       | O.         | Sunshine and cloudy alternately             |
| 27    | 25 09  | 47 0  | 28 33 | 136 0      | 46 25       | 39 25 | S.       | O.         | Sunshine and cloudy alternately             |
| 28    | 25 03  | 39 66 | 30 0  | 114 5      | 36 5        | 34 75 | O.       | O.         | Sunshine and cloudy alternately             |
| 29    | 25 04  | 44 33 | 24 0  | 139 5      | 43 25       | 37 5  | O.       | O.         | Cloudless                                   |
| 30    | 25 28  | 42 0  | 25 5  | 120 0      | 42 0        | 34 0  | O.       | O.         | Cloudless                                   |

DECEMBER 1880.

| Date. | Barom. | Max.  | Min.  | Solar Max. | Hygrometer. | Wind.    |            | REMARKS.                                    |
|-------|--------|-------|-------|------------|-------------|----------|------------|---------------------------------------------|
|       |        |       |       |            |             | Up. Cur. | Val. Wind. |                                             |
| 1     | 25 2   | 45 0  | 21 5  | 120 0      | 42 0        | O.       | O.         | Cloudless                                   |
| 2     | 25 08  | 39 66 | 19 0  | 115 0      | 39 0        | O.       | O.         | Cloudless                                   |
| 3     | 25 12  | 38 5  | 17 0  | 117 0      | 36 33       | O.       | O.         | Cloudless                                   |
| 4     | 25 17  | 43 66 | 17 5  | 125 0      | 42 0        | N.W.     | O.         | Cloudless; some streaks of cirrus           |
| 5     | 25 2   | 36 8  | 19 5  | 120 5      | 36 33       | N.W.     | O.         | Cloudless                                   |
| 6     | 25 24  | 40 8  | 24 0  | 116 0      | 40 0        | N.W.     | O.         | Cloudy till 10 A.M.; then almost cl'dless   |
| 7     | 25 28  | 36 0  | 29 5  | 51 0       | 36 0        | W.       | O.         | Cloudy; occasional snow showers             |
| 8     | 25 37  | 38 33 | 20 0  | 120 5      | 37 0        | N.W.     | O.         | Clouds and sunshine alternately             |
| 9     | 25 21  | 41 66 | 20 0  | 115 0      | 35 0        | W.       | O.         | Cl'dless till 9.30; clouds; after 1.45 snow |
| 10    | 25 05  | 38 5  | 24 0  | 102 0      | 32 5        | S.W.     | N.         | Snow till 11; then sunshine; aftr'n snow    |
| 11    | 25 04  | 37 33 | 24 0  | 103 0      | 36 0        | W.N.W.   | O.         | Sunshine and snow alternately               |
| 12    | 25 03  | 34 0  | 13 0  | 130 0      | 30 0        | N.       | O.         | Cloudless and fine                          |
| 13    | 24 94  | 33 5  | 14 25 | 45 0       | 32 25       | O.       | O.         | Cloudy till 11.30; snow rest of day         |
| 14    | 24 87  | 37 0  | 27 33 | 87 0       | 34 25       | O.       | O.         | Forenoon cloudy; afternoon snow             |
| 15    | 24 88  | 34 5  | 27 5  | 107 5      | 34 0        | N.W.     | O.         | Snow till 10 A.M.; then cloudy              |
| 16    | 24 77  | 41 66 | 17 5  | 137 0      | 40 5        | W.       | O.         | Snow early; cloudy till 10.30; sunshine     |
| 17    | 24 68  | 42 0  | 21 33 | 140 0      | 40 33       | S.W.     | O.         | Sunshine and clouds                         |
| 18    | 24 7   | 36 66 | 27 0  | 105 0      | 36 0        | W.       | N.         | Sunshine and clouds                         |
| 19    | 24 99  | 31 0  | 13 25 | 120 0      | 27 0        | W.       | O.         | Cloudless                                   |
| 20    | 24 92  | 42 25 | 13 75 | 145 0      | 41 5        | S.W.     | O.         | Grey till 9.30; sunshine rest of day        |
| 21    | 24 7   | 39 5  | 24 5  | 109 0      | 38 25       | O.       | N.         | Cloudy till 10.15; snow; gusts of wind      |
| 22    | 25 0   | 27 0  | 13 5  | 125 0      | 21 0        | W.       | O.         | Cloudless                                   |
| 23    | 24 96  | 32 5  | 7 0   | 100 5      | 30 0        | W.       | O.         | Nearly cloudless; streaks of cirrus         |
| 24    | 24 6   | 34 75 | 19 0  | 118 0      | 33 0        | S.W.     | O.         | Cl'dy m'ning & ev'n'g; sun middle of day    |
| 25    | 24 55  | 38 25 | 21 0  | 55 5       | 37 0        | S.       | O.         | Cloudy, and high wind                       |
| 26    | 24 6   | 23 0  | 7 25  | 120 0      | 20 5        | W.       | O.         | Sunshine all day; cumulus on horizon        |
| 27    | 24 74  | 37 0  | 7 0   | 132 0      | 35 5        | W.       | O.         | Sunshine all day; cumulus on horizon        |
| 28    | 24 73  | 41 5  | 21 0  | 131 5      | 38 75       | W.       | O.         | Sunshine and clouds alternately             |
| 29    | 24 73  | 45 5  | 24 25 | 135 0      | 43 0        | S.       | O.         | Cloudless                                   |
| 30    | 24 71  | 40 5  | 31 0  | 68 0       | 37 0        | S.       | O.         | Sunshine and clouds; snow after 5 P.M.      |
| 31    | 24 72  | 28 0  | 26 5  | 115 0      | 27 0        | W.       | O.         | Sunshine; after 4 P.M. cloudy               |

JANUARY 1881.

| Date. | Barom. | Max.  | Min.  | Solar Max. | Hygrometer. | Wind.  |                 | REMARKS.                                   |
|-------|--------|-------|-------|------------|-------------|--------|-----------------|--------------------------------------------|
|       |        |       |       |            |             | Up.    | Cur. Val. Wind. |                                            |
| 1     | 24 97  | 26 5  | 8 25  | 118 0      | 24 0        | N.     | O.              | Nearly cloudless ; streaks of cirrus       |
| 2     | 25 07  | 26 0  | -1 0  | 122 0      | 20 0        | N.     | O.              | Cloudless                                  |
| 3     | 25 02  | 32 0  | 6 0   | 136 0      | 25 25       | O.     | O.              | Nearly cloudless ; streaks of cirrus       |
| 4     | 25 01  | 40 25 | 15 0  | 138 0      | 39 5        | S.S.E. | N.              | Sunshine and clouds                        |
| 5     | 24 78  | 42 75 | 18 5  | 136 5      | 40 0        | S.     | O.              | Cloudless till 12 30 ; then sun veiled     |
| 6     | 24 9   | 41 33 | 22 0  | 95 0       | 41 0        | S.     | O.              | Sunshine till 1 P.M. ; then cloudy         |
| 7     | 25 0   | 28 5  | 3 0   | 120 5      | 28 5        | O.     | O.              | Cloudless                                  |
| 8     | 24 92  | 29 5  | 1 66  | 121 5      | 28 25       | O.     | O.              | Cloudless                                  |
| 9     | 24 75  | 28 66 | 3 75  | 122 0      | 23 0        | O.     | O.              | Cloudless                                  |
| 10    | 24 68  | 28 5  | -5    | 121 0      | 23 5        | O.     | O.              | Cloudless                                  |
| 11    | 24 6   | 27 33 | 0     | 120 0      | 24 33       | O.     | O.              | Cloudless                                  |
| 12    | 24 5   | 27 0  | 0     | 121 0      | 24 5        | O.     | O.              | Cloudless till 3 P.M., then cloudy         |
| 13    | 24 37  | 25 25 | 3 5   | 52 0       | 24 5        | O.     | O.              | Cloudy with partial gleams                 |
| 14    | 24 48  | 20 0  | 5 75  | 114 0      | 16 0        | W.     | O.              | Cloudy till 11 45 ; sunshine rest of day   |
| 15    | 24 27  | 22 5  | 4 0   | 118 0      | 21 0        | S.W.   | N.              | Sunshine all day ; occasional clouds       |
| 16    | 24 48  | 11 25 | 5 0   | 115 0      | 11 0        | N.N.W. | N.              | Sunshine all day ; occasional clouds       |
| 17    | 24 72  | 21 66 | 10 66 | 120 5      | 16 0        | O.     | O.              | Cloudless                                  |
| 18    | 24 43  | 30 0  | -3 0  | 55 0       | 25 5        | S.W.   | O.              | Cloudy till 11 45, then snow till 4        |
| 19    | 24 4   | 30 66 | 7 0   | 55 5       | 28 25       | S.S.W. | O.              | Clouds and sunshine                        |
| 20    | 24 27  | 23 0  | 10 0  | 112 0      | 19 0        | S.     | N.              | Cloudy ; snow nearly all day               |
| 21    | 24 78  | 18 0  | -3 9  | 118 0      | 11 1        | W.     | O.              | Cloudless                                  |
| 22    | 24 89  | 24 0  | -2 0  | 137 0      | 23 25       | O.     | O.              | Cloudless                                  |
| 23    | 24 67  | 21 0  | -2 0  | 128 5      | 19 5        | O.     | O.              | Cloudless                                  |
| 24    | 24 92  | 20 0  | -10   | 123 0      | 18 0        | O.     | O.              | Clouds and sunshine                        |
| 25    | 24 85  | 23 25 | -5    | 118 0      | 22 0        | S.W.   | N.              | Clouds and sunshine ; strong wind          |
| 26    | 24 6   | 30 75 | 10 75 | 131 5      | 29 25       | N.N.W. | O.              | Clouds and sunshine                        |
| 27    | 24 58  | 40 5  | 9 0   | 133 0      | 40 0        | W.N.W. | O.              | Clouds and sunshine                        |
| 28    | 24 44  | 42 25 | 9 0   | 125 0      | 40 5        | S.W.   | O.              | Snow till 9 ; cloudy till 11 45 ; sunshine |
| 29    | 24 51  | 42 66 | 14 5  | 130 0      | 40 25       | S.W.   | O.              | Clouds and sunshine                        |
| 30    | 24 39  | 38 25 | 19 0  | 108 0      | 37 25       | S.     | O.              | Clouds and sunshine                        |
| 31    | 24 62  | 42 5  | 18 0  | 153 0      | 37 0        | S.W.   | O.              | Clouds and sunshine                        |

## FEBRUARY 1881.

| Date. | Barom. | Max.  | Min.  | Solar<br>Max. | Hygrometer. | Wind.    |            | REMARKS.                                 |
|-------|--------|-------|-------|---------------|-------------|----------|------------|------------------------------------------|
|       |        |       |       |               |             | Up. Cur. | Val. Wind. |                                          |
| 1     | 24 62  | 41 33 | 9 25  | 134 0         | 40 0        | N.W.     | O.         | Cloudless till 1.45, then cloudy         |
| 2     | 24 83  | 40 33 | 12 25 | 135 0         | 37 25       | N.       | O.         | Clouds and sun                           |
| 3     | 24 9   | 42 0  | 10 66 | 135 0         | 36 0        | O.       | O.         | Cloudless                                |
| 4     | 24 65  | 44 25 | 13 0  | 135 0         | 40 0        | O.       | O.         | Cloudless                                |
| 5     | 24 65  | 42 0  | 12 25 | 135 0         | 36 0        | S.       | O.         | Sunshine and clouds                      |
| 6     | 24 55  | 25 2  | 19 0  | 60 0          | 24 66       | O.       | N.         | Snow all day; strong wind                |
| 7     | 24 81  | 37 0  | 19 5  | 117 0         | 23 5        | W.       | N.         | Snow till 9.15, then clouds and sunshine |
| 8     | 24 62  | 34 0  | 7 0   | 95 0          | 30 5        | W.       | O.         | Snow; strong breeze                      |
| 9     | 24 52  | 33 5  | 22 25 | 98 0          | 29 0        | W.N.W.   | O.         | Snow; strong breeze                      |
| 10    | 24 6   | 43 0  | 24 25 | 138 0         | 42 5        | W.       | O.         | Snow till 8.30, then sunshine            |
| 11    | 24 32  | 35 5  | 22 0  | 135 0         | 35 0        | N.W.     | O.         | Snow till 8 A.M.; wind; afternoon gleams |
| 12    | 24 49  | 24 0  | 13 0  | 55 0          | 18 25       | N.W.     | N.         | Snow showers till 2, then clouds and sun |
| 13    | 24 86  | 32 75 | 10 0  | 119 0         | 28 0        | N.W.     | N.         | Snow and sunshine                        |
| 14    | 24 78  | 32 66 | -5 5  | 142 0         | 31 5        | N.W.     | O.         | Cloudless                                |
| 15    | 24 7   | 44 0  | 1 0   | 144 5         | 40 0        | O.       | O.         | Cloudless till 4.40 P.M., then cirrus    |
| 16    | 24 84  | 48 5  | 12 0  | 144 0         | 46 0        | S.W.     | O.         | Cloudy till 9.15, then cloudless         |
| 17    | 24 88  | 46 75 | 18 5  | 133 0         | 45 5        | S.       | O.         | Clouds and sunshine alternately          |
| 18    | 24 92  | 44 66 | 20 0  | 134 0         | 42 8        | S.S.W.   | O.         | Sunshine, at times veiled by cirrus      |
| 19    | 24 9   | 46 5  | 19 5  | 147 0         | 43 0        | W.S.W.   | O.         | Sunshine, at times veiled by cirrus      |
| 20    | 24 98  | 45 5  | 18 25 | 133 0         | 44 0        | S.W.     | O.         | Sunshine, at times veiled by cirrus      |
| 21    | 25 25  | 48 5  | 25 5  | 134 0         | 46 0        | S.W.     | O.         | Sunshine nearly all day                  |
| 22    | 25 00  | 48 0  | 20 0  | 134 0         | 41 25       | O.       | O.         | Cloudless                                |
| 23    | 25 00  | 48 0  | 17 0  | 138 0         | 45 5        | S.W.     | O.         | Cloudless                                |
| 24    | 25 00  | 42 75 | 13 75 | 129 0         | 40 5        | O.       | O.         | Cloudless                                |
| 25    | 24 85  | 42 25 | 13 5  | 133 0         | 39 0        | O.       | O.         | Nearly cloudless; a little cumulus       |
| 26    | 24 76  | 43 66 | 12 0  | 130 0         | 42 5        | W.       | O.         | Cloudless                                |
| 27    | 24 7   | 41 66 | 16 0  | 79 0          | 41 0        | S.       | O.         | Sunshine till 10 A.M., then cloudy       |
| 28    | 24 64  | 41 66 | 22 5  | 129 0         | 40 0        | S.       | O.         | Sunshine and clouds                      |

M A R C H 1881.

| Date. | Barom. | Max.  | Min.  | Solar<br>Max. | Hygrometer. |       | Wind.    |            | REMARKS.                                   |
|-------|--------|-------|-------|---------------|-------------|-------|----------|------------|--------------------------------------------|
|       |        |       |       |               |             |       | Up. Cur. | Val. Wind. |                                            |
| 1     | 24 55  | 25 33 | 24 25 | 57 0          | 23 0        | 22 0  | O.       | O.         | Snow all day                               |
| 2     | 24 84  | 24 0  | 14 0  | 140 0         | 22 0        | 19 0  | N.       | N.         | Sunshine and clouds                        |
| 3     | 24 75  | 35 66 | — 4   | 126 0         | 32 5        | 26 0  | N.       | N.         | Cloudless                                  |
| 4     | 24 8   | 36 33 | 11 33 | 76 0          | 34 25       | 32 25 | O.       | O.         | Cloudy all day                             |
| 5     | 24 7   | 42 25 | 24 0  | 82 0          | 40 0        | 35 0  | O.       | O.         | Cloudy, with occasional gleams             |
| 6     | 24 74  | 46 0  | 29 25 | 82 0          | 40 0        | 33 0  | S.       | O.         | Cloudy, with occasional gleams             |
| 7     | 24 85  | 54 5  | 34 33 | 118 0         | 47 25       | 43 0  | W.       | O.         | Cloudy till 12.45, then sunshine           |
| 8     | 24 87  | 40 5  | 32 5  | 136 0         | 40 25       | 37 5  | N.       | O.         | Sunshine till 1.15; then cloudy and snow   |
| 9     | 25 02  | 37 66 | 27 25 | 117 0         | 32 0        | 30 0  | O.       | O.         | Snow till 11; sun till 2; cloudy & snow    |
| 10    | 25 04  | 39 0  | 28 5  | 59 0          | 33 0        | 32 0  | O.       | N.         | Snow all day                               |
| 11    | 25 06  | 39 66 | 28 0  | 89 0          | 39 5        | 38 0  | N.N.W.   | O.         | Snow till 8.45 A.M.; then cloudy           |
| 12    | 24 92  | 52 5  | 22 0  | 156 0         | 48 5        | 38 5  | N.W.     | O.         | Cloudless till 4.15 P.M.; then grey        |
| 13    | 24 81  | 46 33 | 24 0  | 140 0         | 44 5        | 38 0  | N.       | O.         | Cloudless                                  |
| 14    | 24 81  | 49 5  | 12 0  | 140 0         | 47 0        | 34 0  | O.       | O.         | Cloudless                                  |
| 15    | 24 98  | 49 5  | 15 0  | 128 0         | 44 5        | 34 5  | O.       | O.         | Cloudless                                  |
| 16    | 25 08  | 44 5  | 14 33 | 127 2         | 42 0        | 34 0  | O.       | O.         | Cloudless                                  |
| 17    | 25 2   | 44 0  | 12 5  | 127 2         | 42 0        | 33 0  | O.       | N.         | Cloudless                                  |
| 18    | 25 31  | 42 5  | 14 0  | 114 0         | 38 0        | 31 0  | O.       | O.         | Clouds and sunshine                        |
| 19    | 24 91  | 52 75 | 24 5  | 119 0         | 50 5        | 41 0  | O.       | O.         | Cloudless                                  |
| 20    | 24 91  | 51 25 | 25 0  | 130 0         | 50 0        | 40 0  | S.       | N. & S.    | Sun all day, but at times veiled by cirrus |
| 21    | 24 66  | 44 0  | 31 5  | 129 5         | 42 0        | 37 0  | W.N.W.   | S.         | Snow showers; occasional sunshine          |
| 22    | 24 55  | 25 0  | 21 0  | 120 0         | 24 0        | 22 0  | O.       | N.         | Snow and high wind all day                 |
| 23    | 24 95  | 39 0  | 14 5  | 150 0         | 34 0        | 27 0  | N.W.     | N.         | Strong wind, sunshine and clouds           |
| 24    | 24 95  | 40 5  | 18 0  | 126 0         | 38 0        | 32 0  | W.       | N.         | Strong wind, sunshine and clouds           |
| 25    | 24 52  | 50 0  | 30 0  | 142 0         | 43 5        | 37 25 | N.W.     | O.         | Sunshine all day; sun sometimes veiled     |
| 26    | 24 66  | 44 2  | 28 75 | 128 0         | 42 5        | 37 0  | S.       | O. & N.    | Cloudy till 8.45, then cloudless           |
| 27    | 24 6   | 50 2  | 19 25 | 130 0         | 48 5        | 35 0  | O.       | O.         | Cloudless                                  |
| 28    | 24 7   | 53 5  | 20 0  | 135 0         | 52 25       | 38 0  | O.       | O.         | Cloudless                                  |
| 29    | 24 7   | 54 5  | 21 5  | 137 0         | 52 0        | 38 0  | S.W.     | N.         | Strong breeze; cloudy; from 4 P.M. mist    |
| 30    | 24 62  | 51 75 | 31 0  | 103 0         | 45 0        | 40 5  | S.       | N.         | Mist till 10 A.M., then sun and clouds     |
| 31    | 24 65  | 50 5  | 31 0  | 120 0         | 46 5        | 42 0  | S.       | N.         |                                            |

## A COMPARATIVE WEATHER TABLE OF PAU IN THE PYRENEES.

Register of Weather Table at Pau, prepared by Dr Ottley of Pau. The following tables will, we think, be found useful, as they afford data, from which a pretty clear conception may be formed of the character of the Pau climate in winter, as compared with that of S. of England, as represented by Greenwich and Kew, and of Davos, as represented by our own tables. In Table I. the *average* climate of each month at Pau, from October to May inclusive, is compared with the *average* climate, as registered at Greenwich Observatory:—

### I.—AVERAGE WEATHER TABLE

Shewing the average state of the weather in each month of the winter season at Pau, from eight years' observations, and at Greenwich from thirty-four—

|                                                                    |            | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | April. | May. |
|--------------------------------------------------------------------|------------|------|------|------|------|------|------|--------|------|
| Calculated mean temp. of each month, - - -                         | Greenwich, | 50 4 | 43 6 | 39 4 | 36 4 | 38 8 | 42 0 | 46 8   | 53 7 |
|                                                                    | Pau,       | 56 5 | 46 9 | 42 5 | 40 5 | 43 2 | 47 9 | 53 3   | 57 5 |
| Mean of the lowest temp. of each twenty-four hours in the month, - | Greenwich, | 42 2 | 38 7 | 32 3 | 28 5 | 32 3 | 35 3 | 40 4   | 48 8 |
|                                                                    | Pau,       | 49 6 | 41 0 | 37 1 | 35 1 | 36 9 | 41 3 | 46 6   | 49 6 |
| Mean of the temp. at 9 A.M. daily, - - -                           | Greenwich, | 50 2 | 43 8 | 38 5 | 37 8 | 37 3 | 40 8 | 47 3   | 55 6 |
|                                                                    | Pau,       | 57 1 | 45 6 | 40 8 | 38 9 | 41 8 | 48 0 | 54 8   | 58 0 |
| Mean of the highest temp. of each day, - - -                       | Greenwich, | 55 5 | 49 8 | 44 5 | 44 2 | 43 9 | 47 1 | 50 9   | 57 9 |
|                                                                    | Pau,       | 64 9 | 54 4 | 48 1 | 47 1 | 50 4 | 56 1 | 62 2   | 64 9 |
| Mean humidity of the air at 9 A.M. Saturated air taken as 100.     | Greenwich, | 92 0 | 94 0 | 94 0 | 94 0 | 91 0 | 87 0 | 84 0   | 79 0 |
|                                                                    | Pau,       | 80 0 | 81 0 | 83 0 | 82 0 | 81 0 | 79 0 | 73 0   | 74 0 |

No observations on the force of the wind have been made

## *92 Comparative Weather Table of Pau in the Pyrenees.*

---

at Pau. We are convinced, however, that this is one of the most important points to be attended to in seeking a climate for invalids.

In the tables some of the observations as to rainfall, Barometer pressure, and mean amount of sky covered with cloud, have been omitted. The remainder of the matter is copied *ipsissimis verbis* from "Climate of Pau," &c., by Sir A. Taylor, M.D., Edinburgh, F.R.S.E., corresponding Member of the Hist. Institute of France, Published 1866, Churchill & Sons, London.



## EXCURSIONS.

From Davos several short excursions can be made by those who are not confirmed invalids.

1st. To the summit of the Flüela Pass, nearly 8000 feet, either on foot or by sleigh. There is an inn here called the "Hospice," but it is dirty, uncomfortable, and extortionate in its charges. The one nearer Davos, the Alpine Glöcke, is better.

2d. To the top of the Dischma Thal by sleigh.

3d. To Frauenkirch, two miles. From Frauenkirch up the Sertig Thal, either on foot or by sleigh.

4th. To Weisen, twelve miles.

5th. To Thusis, twenty miles, spending the night there. The Rhætia, kept by Mr Le Malta, who speaks English thoroughly, is one of the best and most comfortable hotels on the Continent, and exceedingly reasonable; while the landlord himself is a most courteous and obliging gentleman. This excursion would also include a walk or ride of five miles into the wonderful Via Mala which begins at Thusis. The return to Davos can be made by diligence.

6th. An ascent of the Schiahorn for those who are strong. If the snow is deep the ascent may be found a little difficult by those unaccustomed to climbing. In this case a guide should be taken. The view from the summit is very grand.

7th. An ascent of the Schwarzhorn. Guide necessary. This excursion should not be made excepting by good pedestrians.

## AMUSEMENTS.

In addition to pedestrian and sleighing excursions, the visitor will be able to find amusement in the Canadian exercise of *Tobogging*. The toboggin consists of a small wooden sleigh, the seat being composed of bars of wood. Seating yourself on this you glide swiftly down a suitable snow slope, steering the sleigh with your heels, which project forward, or by means of two small sticks trailed behind. The latter method, however, is difficult and requires practice. The exercise is most enjoyable and exhilarating.

It will be interesting to state that the word "Tobogging" was introduced by the Gaelic speaking emigrants to Canada. It is composed of the Celtic or Gaelic "*tob*"—a surprise, and especially a pleasant surprise; and of *bogadar*—a rapid motion, a shaking, a sliding; whence "tobogging," the rapid and pleasant descent down an ice or snow path.

To those who are fond of skating, two ice rinks—one of them belonging to the Hotel Belvedere—offer opportunities for indulging in the art. Twenty francs for the season is charged for the use of each rink. When the snow-fall is not very heavy excellent skating may be had on the Davoser-See (lake).

We understand that Herr Demmer, proprietor of the Angleterre, has constructed a rink specially for the use of visitors to his hotel. All sorts of skates may be purchased in the village, but they are dear.

Private theatricals, charades, and readings are frequent; and a company of German actors locate themselves in the village during the winter and give frequent performances in a highly creditable manner.

A band plays at each hotel three times a week. Dances are frequent, and at Christmas time there are several balls given by the leading hotels.

Ladies who are fond of doing fancy work should take a good supply of needles, wools, silk, &c., with them from England, as these articles are not always procurable in Davos.

Teachers of languages, drawing masters, music masters, &c., abound.

English books—at a considerable advance in price—may be procured through Herr Richter. The Belvedere has a small library. English papers should be ordered direct from England. The postage on all papers, including the *Graphic*, *Illustrated London News*, &c., is one penny from the United Kingdom.

There is a small paper called the *Davoser Blätter*, published in Davos partly in English and partly in German, but it is a lamentable production and ridiculously dear.



## DIETARY SCALE.

At all the hotels the dietary scale is, as nearly as possible, alike. It consists of three meals a day.

### BREAKFAST,

FROM SEVEN TO NINE,

Consists of coffee, tea or cocoa, with bread and butter and so-called honey. The latter, however, is a villanous chemical compound, found upon the table of nearly every hotel in Switzerland. It is composed for the most part of glycerine, the juice of pears and sugar, and is a perfect enemy to digestion. Therefore don't use it. Nearly every ounce of real honey produced in Switzerland is exported. New milk fresh from the cow is brought to the bedrooms, if ordered, at about seven in the morning and four in the afternoon. The usual charge is twenty centimes (twopence) per glass, containing less than half a pint. At the Milchhalle in connection with the Kurhaus you can have the milk drawn from the cow while you wait, for fifteen centimes the glass.

### LUNCHEON,

ONE O'CLOCK,

Soup, two meats, vegetables and cheese or pudding.

### DINNER,

SIX O'CLOCK,

Soup, fish occasionally, beef or mutton, one or more

entrées, vegetables, the inevitable *poulet rôti* and salad, with pudding and dessert.

On the whole the food is, perhaps, as fair as can be expected, but there is so little variation that it becomes dreadfully monotonous after a time. The beef and mutton are not to be compared to our Scotch and Southdown, and English people who know what good puddings and pies are, will scarcely relish Swiss pastry. As we, however, are considered by foreigners to be such barbarous cooks it may be heresy in the eyes of some people (especially those who have never been abroad) to take exception to continental cooking. Well ; *De gustibus non est disputandum*.

There is an excellent confectioner's shop in the village kept by Herr Casparis, where all sorts of English preserved foods may be obtained at reasonable prices.



## MEMORANDA.

Before leaving for Switzerland obtain a passport. It may not be wanted, but it is useful, and no traveller ought to go to the Continent without one. Application for Foreign Office passports should be made in writing addressed—

THE CHIEF CLERK,

*Foreign Office,*

LONDON.

The word *Passport* must be legibly written on the outside, left-hand corner of the envelope. The fee is *two shillings*, and if the application is not made personally the amount must be enclosed by Post-Office order, *not in stamps*, made payable at Charing Cross Post-Office, to Chief Clerk of the Foreign Office. A large envelope, properly stamped for the return of the passport must be sent, together with a certificate that the applicant is a British subject. This certificate can be obtained from your clergyman, banker, lawyer, or any other respectable person.

*N.B.*—It is not generally known that every gendarme, garde de paix, or public official, is empowered to ask to see a foreigner's passport at any moment. In Germany, France, and Switzerland, this power has fallen into abeyance; but, still, a too over zealous public servant does sometimes exercise his authority, and if the traveller should not happen to be provided with the necessary document he may be put to a

great deal of annoyance. Therefore get a passport by all means.

Travellers should ask the landlords of the hotels at which they stay to settle for cab fares and portorage of luggage. It will save annoyance and extortion.

As far as Zurich, French is chiefly spoken. After that German ; but nearly all the hotel proprietors and waiters understand English, and at the principal railway stations there is an interpreter. Ask for him in case of dispute and if you don't know the language. Many of the conductors of the trains speak a little English.

Civility to all officials and servants with whom you come in contact will ensure civility in return. Foreigners are very punctilious, and sensitive on points of honour.

The speed of all trains on the Continent is very much lower than on our own railways. This is especially the case on Swiss lines. It is annoying, but teaches patience.

Swiss carriages are well warmed in winter. Fares are very reasonable, but the charges for luggage very high.

Telegraphing in Switzerland is cheap. When you reach Bâle telegraph to the proprietor of the hotel you select in Chur, and tell him to have a fire in your bedroom. This is important. A fire for the night will cost you a franc, to two francs.

Port wine and sherry are generally execrable. Don't order them.

At the principal hotels in Davos the proprietors take cheques from their visitors. The rate of exchange varies from ten centimes to thirty (or threepence) on the pound.

English *five pound* bank notes are most useful, being current everywhere. Letters of credit are sometimes a nuisance, and often cause delay.

Before leaving London provide yourself with some French money for use on the journey. Some of it in half francs.

If you object to smoking ask the guard to put you into a non-smoking carriage. Nearly all Continental lines provide special compartments for ladies.

Never offer *sovereigns* at booking offices, as you are very apt to receive change for a napoleon (20 francs) only.

All cab drivers on the Continent expect a small fee over their fare. It is called a *pour boire*. From twenty to thirty centimes is plenty.

Hotels do not provide *soap*, except at an extortionate charge. Always carry a supply with you.



## THERMOMETER TABLES.

Réaumur and Centigrade are used on the Continent. They are both simpler than Fahrenheit. To convert degrees of Réaumur into Fahrenheit, if *above* freezing point, multiply by  $2\frac{1}{4}$  and add  $32^{\circ}$ , if *below* freezing point, multiply by  $2\frac{1}{4}$  and subtract from  $32^{\circ}$ .

To convert degrees of Centigrade into those of Fahrenheit multiply by one four-fifths, and add  $32^{\circ}$  if *above* freezing point, or subtract if *below* it.

### KILOMETRES AND MILES.

| Kilometre |             | Miles. | Mile |          | Kilometres. |
|-----------|-------------|--------|------|----------|-------------|
| 1         | is equal to | 0.621  | 1    | equal to | 1.609       |

### METRES, YARDS AND FEET.

| Metre |          | Yard | Feet. |
|-------|----------|------|-------|
| 1     | equal to | 1.09 | 3.281 |

## COMPARATIVE VALUE OF MONEY.

An English sovereign is worth 25 francs 25 or 30 centimes according to the rate of exchange.

A napoleon is worth 15 shillings and ninepence, or twenty francs.

English shillings are not generally accepted. Where they are taken only a franc is allowed for them.



## V O C A B U L A R Y.

For the use of travellers who do not speak German, we append a few simple words and phrases, such as are likely to be found necessary during the journey :—

| ENGLISH.       | GERMAN.                            |
|----------------|------------------------------------|
| Breakfast.     | Das Frühstück.                     |
| Dinner.        | Das Mittagessen.                   |
| Luncheon.      | Die Zwischenmahlzeit.              |
| Soup.          | Die Suppe.                         |
| Boiled Meat.   | Gekochtes Fleisch.                 |
| Roast Meat.    | Gebratenes Fleisch.                |
| Beef.          | Ochsen Fleisch.                    |
| Roast Beef.    | Ochsen Braten.                     |
| Veal.          | Kalb Fleisch.                      |
| Veal Cutlets.  | Kalb's Cotelets.                   |
| Mutton.        | Hammelfleisch.                     |
| Ham.           | Schinken.                          |
| Eggs.          | Eier (plural), Eine Ei (singular). |
| Butter.        | Die Butter.                        |
| Cheese.        | Der Kase.                          |
| Potatoes.      | Die Kartoffeln.                    |
| Water.         | Das Wasser.                        |
| Beer.          | Das Bier.                          |
| Hock.          | Der Rheinwein.                     |
| Coffee.        | Der Kaffee.                        |
| Tea.           | Der Thee.                          |
| Milk.          | Die Milch.                         |
| Cream.         | Die Sahne (f) Der Rahm (m).        |
| Chocolate.     | Die Chocolate.                     |
| Lemonade.      | Limonade.                          |
| Mineral Water. | Mineral Wasser.                    |

## NUMBERS.

| ENGLISH.   | GERMAN.    |
|------------|------------|
| One.       | Eins.      |
| Two.       | Zwei.      |
| Three.     | Drei.      |
| Four.      | Vier.      |
| Five.      | Fünf.      |
| Six.       | Sechs.     |
| Seven.     | Sieben.    |
| Eight.     | Acht.      |
| Nine.      | Neun.      |
| Ten.       | Zehn.      |
| Eleven.    | Elf.       |
| Twelve.    | Zwölf.     |
| Thirteen.  | Dreizehn.  |
| Fourteen.  | Vierzehn.  |
| Fifteen.   | Fünfzehn.  |
| Sixteen.   | Sechszehn. |
| Seventeen. | Siebzehn.  |
| Eighteen.  | Achtzehn.  |
| Nineteen.  | Neunzehn.  |
| Twenty.    | Zwanzig.   |

## ORDINAL NUMBERS.

|             |             |
|-------------|-------------|
| The First.  | Der Erste.  |
| The Second. | Der Zweite. |
| The Third.  | Der Dritte. |

The reader will be struck with the similarity between the English and the German words in many instances.

In German *every letter* is sounded and has its value, so that *Erste* is pronounced as near as possible *Erster*.

## PHRASES.

| ENGLISH.                  | GERMAN.                       |
|---------------------------|-------------------------------|
| I am tired.               | Ich bin müde.                 |
| I am thirsty.             | Ich bin durstig.              |
| I am much obliged to you. | Ich bin Ihnen sehr verbunden. |
| Is dinner ready?          | Ist das Mittagessen fertig?   |
| Is it time to go?         | Ist es Zeit abzureisen?       |

## PHRASES.

| ENGLISH.                                           | GERMAN.                                                                          |
|----------------------------------------------------|----------------------------------------------------------------------------------|
| What time is it?                                   | Wie viel Uhr ist es?                                                             |
| How many miles is it?                              | Wie viel Stunden sind es?                                                        |
| Are there any letters for me?                      | Sind Briefe für mich da?                                                         |
| It is not enough.                                  | Das ist nicht genug.                                                             |
| I will not have any wine.                          | Ich will keinen Wein.                                                            |
| Go away.                                           | Gehet weg.                                                                       |
| Come here.                                         | Kommen Sie hieher.                                                               |
| Make haste.                                        | Beeilen Sie sich.                                                                |
| Shut the window.                                   | Schliesset das Fenster.                                                          |
| Open the door.                                     | Oeffnet die Thüre.                                                               |
| Brush my clothes.                                  | Bürstet meine Kleider.                                                           |
| Give me a glass of water.                          | Geben Sie mir ein Glass Wasser.                                                  |
| Call me at — o'clock.                              | Weken Sie mich um — Uhr.                                                         |
| Show me the way.                                   | Zeige mir den Weg.                                                               |
| This morning.                                      | Diesen Morgen.                                                                   |
| This afternoon.                                    | Diesen Nachmittag.                                                               |
| This evening.                                      | Diesen Abend.                                                                    |
| It is very dirty.                                  | Es ist sehr schmutzig.                                                           |
| Have you any silver?                               | Haben Sie Silbergeld?                                                            |
| I want change for a Napoleon.                      | Ich brauche Kleines Geld für einen Louis d'or.                                   |
| Can you change me a sovereign?                     | Können Sie mir einen Souverain wechseln?                                         |
| Please, which is the way to go?                    | Ich bitte Sie, welcher Weg führt nach?                                           |
| Ist this the right way?                            | Ist dies der rechte Weg?                                                         |
| Good morning to you.                               | Ich wünche Ihnen guten Tag.                                                      |
| When will breakfast be ready?                      | Wann wird das Frühstück fertig sein?                                             |
| I prefer coffee.                                   | Ich ziehe den Kaffee vor.                                                        |
| I shall take a roll.                               | Ich werde ein Bröckchen nehmen.                                                  |
| What time do we dine to-day?                       | Um welche Zeit essen wir heute?                                                  |
| Waiter, can you show me a good room and clean bed? | Kellner, können Sie mir einen ausländiges Zimmer und ein sauberes Bett anweisen? |
| Have my luggage carried up.                        | Lassen Sie mein Gepäck sogleich herauftragen.                                    |

## PHRASES.

## ENGLISH.

## GERMAN.

Bring me some fresh water, please. Bringen Sie mir frisches Wasser,  
bitte.

At what o'clock does the train leave for — ? Um wie viel Uhr geht des Bahnzug  
nach — ?

Bring me some matches, please. Bringen sie mir Zündhölzchen bitte.  
Have a fire made in my room, Lassen Sie in meinem Zimmer ein  
please. Feuer anmachen, bitte.

*Feuer* in German is pronounced as nearly as possible like  
the English word *fire*.

|                                                           |                                                            |
|-----------------------------------------------------------|------------------------------------------------------------|
| Good night, sir.                                          | Gute nacht, mein Herr.                                     |
| Who knocks at the door ?                                  | Wer klopft an die Thüre ?                                  |
| How much do you ask for it ?                              | Wie viel verlangen Sie dafür ?                             |
| Is the bed good ?                                         | Ist das Bett gute ?                                        |
| Can I have warm water ?                                   | Kann ich warmes Wasser zum<br>Waschen haben ?              |
| Is the bed clean ?                                        | Ist das Bett reinlich ?                                    |
| I have my passport.                                       | Ich habe meinen Pass.                                      |
| What are your prices ?                                    | Wie theuer sind die Plätze.                                |
| Send for a cab, please.                                   | Lassen Sie eine Droschke holen,<br>bitte.                  |
| Where is the luggage booking-<br>office, please ?         | Wo ist die Gepäckannahme, bitte ?                          |
| Please to give me one (two) first-<br>class tickets to —. | Ich bitte, um eins (zwei) Billete<br>erster Classe nach —. |
| What do they cost ?                                       | Wie viel kosten sie ?                                      |
| Where is the first-class waiting-<br>room, please ?       | Wo ist der Wartsaal erster classe,<br>bitte ?              |
| Is this the train for — ?                                 | Ist dies der Zug nach — ?                                  |
| Open the door of this carriage for<br>me, please.         | Oeffnen Sie mir diesen Wagen,<br>bitte.                    |
| Thank you.                                                | Ich danke.                                                 |

*N.B.*—It is necessary to remember that the German W  
is always pronounced like our V. Therefore, Wiesen—  
would be Viesen. Wasser—Vasser. Wo (where) Vo. Z  
has the dental sound of *ts*. If these hints are borne in mind,

even a person who essays German for the first time, may make himself understood with any of the above words or phrases.

All German substantives and other words employed substantively begin with a CAPITAL letter.



---

## HOTELS AND PENSIONS AT DAVOS.

|               |                                       |
|---------------|---------------------------------------|
| ANGLETERRE,   | - First-Class, English.               |
| BELVEDERE,    | - First-Class, English.               |
| BERGADLER,    | - First-Class and home-like, English. |
| BOLLINGER,    | - German.                             |
| BUOL, -       | - Good—English and German.            |
| EISENLOHR,    | - Good.                               |
| KILP,         |                                       |
| KURHAUS,      | - Principally German.                 |
| POST, -       | - German.                             |
| RATHHAUS,     | - German.                             |
| RHÆTIA,       | - Good—German and English.            |
| SCHWEIZERHOF, | - Good—Principally German.            |
| STRELA,       | - Good—used Principally by Germans.   |
| WALDHAUS,     |                                       |

---

*Pension may be had in a few of the private houses, but we know nothing about them.—ED.*



## NOTICE TO ADVERTISERS.

---

The First Edition of this Book being nearly all ordered, a Second Edition will shortly be issued, for which a few select advertisements will be accepted.

For terms, &c., intending advertisers should address communications as follows :—

THE EDITOR,

"DAVOS-PLATZ,"

SIMPKIN, MARSHALL, & Co.,

STATIONERS' HALL COURT,

LONDON.

---

## AVIS AUX PUBLICATEURS.

---

La première édition de ce livre étant presque entièrement épuisée, une seconde édition paraîtra prochainement, pour laquelle quelques annonces choisies seront acceptées.

---

Les Publicateurs qui désirent connaître les conditions sont priés d' adresser leurs communications à :—

**L' E D I T E U R,**

**" D A V O S - P L A T Z,"**

**SIMPKIN, MARSHALL, & Co.,**

**STATIONERS' HALL COURT,**

**L O N D R E S.**

---

---

**NOTIZ FÜR DEN VERÖFFENTLICHER.**

---

Da die erste Auflage dieses Werkes schon erschöpft ist, so wird eine Zweite, für welche Anzeigen angenommen werden, in kürzer Frist erscheinen.

Zeitungs Referenten sind gebeten um die näheren Bedingungen sich an Unterzeichnete zu wenden :—

**E D I T O R,**

**" D A V O S - P L A T Z,"**

**SIMPKIN, MARSHALL, & Co.,**

**STATIONERS' HALL COURT,**

**L O N D O N.**

## HOTEL AND PENSION, D'ANGLETERRE, DAVOS-PLATZ.

THIS First-Class FAMILY and GENERAL HOTEL is situated at the entrance of the Village of DAVOS-PLATZ, commands extensive and pleasing views all over the Valley, and is within a few minutes' walk of great Pine Forests which clothe the Mountains to a vast height on both sides ; it stands in a free and open position, avoiding the disagreeables necessarily incidental to a house in a town, and RETAINING THE SUNSHINE LONGER THAN ANY OTHER HOTEL ; it is surrounded by extensive meadows belonging to the Proprietor, in which are Pleasure Grounds, space for English games and a Gymnasium. The Hotel is compact and well built, thus affording unusual facilities for being warmed in winter, and also rendering ventilation in summer more easy and perfect. The House is supplied with every modern comfort and convenience ; the Rooms (many with balconies) are high, airy, and well arranged, and have all the requirements of a comfortable Residence. In winter the Passages and Public Rooms are thoroughly warmed, and each Bedroom can be heated at the desire of the guest. Cleanliness in all departments carefully attended to. THE WATER SUPPLY IS PERFECT ; THE SANITARY ARRANGEMENTS AND THE DRAINAGE ARE ON THE MOST APPROVED PRINCIPLES. There is a large Balcony and covered Verandah for taking exercise in. The Public Rooms, Dining-Room, Drawing-Room, and Café-Billiard are good. There is an English Library, and well selected English daily and illustrated papers are taken. The *cuisine* is first-rate, and the Wines are of the best vintages. All wants and wishes of the guests will be most anxiously and zealously attended to. The terms are moderate ; pension from 5s 6d per day, according to the size, position, and arrangement of the Room selected. The pension includes : Bedroom, Breakfast, Luncheon and Dinner. English, French, and German spoken. English Bank notes, Cheques, etc., cashed in the Hotel. The Hotel is open all the year round except during the latter end of April and the month of May, when the annual snow-melting renders the air somewhat damp and less beneficial to invalids.

THE GENERAL COMFORT AND HEALTHFULNESS OF THIS HOTEL ARE SUFFICIENTLY PROVED BY THE RETURN TO IT OF THE SAME INVALIDS AND PLEASURE-SEEKERS YEAR AFTER YEAR.

ADVERTISEMENTS.

# HOTEL AND PENSION BELVEDERE

AT  
**D A V O S - P L A T Z,**  
CANTON DES GRISONS, SWITZERLAND.

**L**ARGE FIRST-RATE HOTEL; open during the whole year, excepting the Months of April and May, when the melting of the winter's snow renders the climate less salubrious. This establishment is mostly frequented by English, the Church services are held here, the Chaplain residing in the house.

The accommodation is of late greatly increased, and the Hotel provided with every modern comfort and convenience, large Public Rooms, and an English Billiard Table.

The position of the Belvedere is excellent, being close to the Pine Forests, and commanding beautiful views of the whole Valley. Pension, including Room, from 5s 6d upwards per diem, according to the position, size, and arrangement of the Room selected.

TO BE LET FURNISHED:—

## **THE VILLA BELVEDERE,**

**Facing South, and Suitable for a Family.**

ALL FURTHER INFORMATION GLADLY GIVEN  
BY THE PROPRIETOR,

**J. C. COESTER.**

# PRIVATE ENGLISH PENSION, BERGADLER.

---

**T**HE ENGLISH PENSION, BERGADLER, a most comfortable and home-like Residence, is pleasantly situated two minutes' walk from the Diligence Terminus.

The Housekeeping is conducted under the personal Superintendence of an English Lady.

Specially recommended to Invalids needing quiet, combined with wholesome English Cooking.

---

*Single Rooms, with Pension included,  
from 7 to 10 Francs Daily.*

*Double Bedded Rooms, 14, 15, and 16 Francs.*

---

POSTAL ADDRESS—

**F. PESTALOZZI,  
BERGADLER,  
DAVOS-PLATZ,  
GRISONS, SWITZERLAND.**

FOR MEMORANDA.





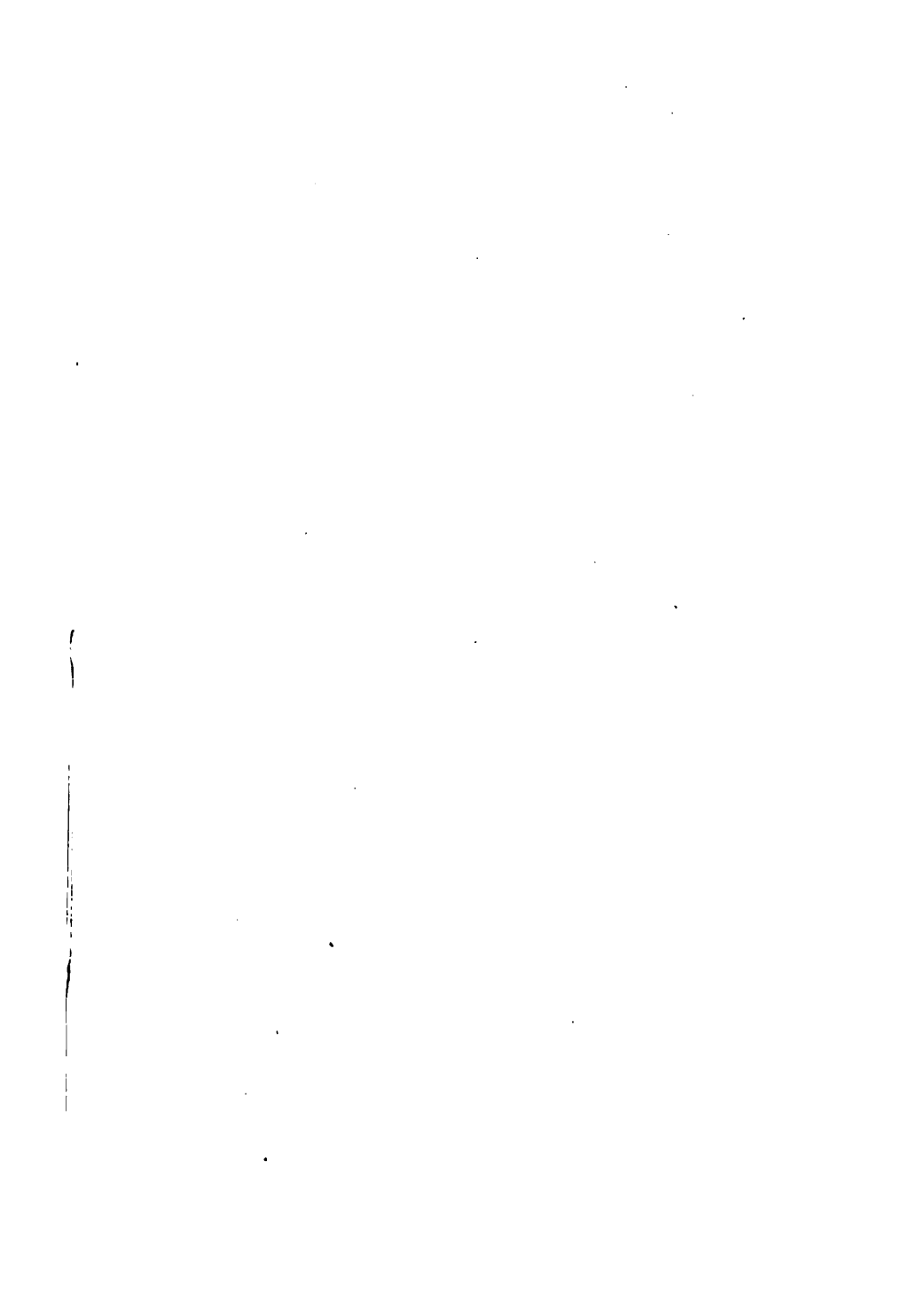


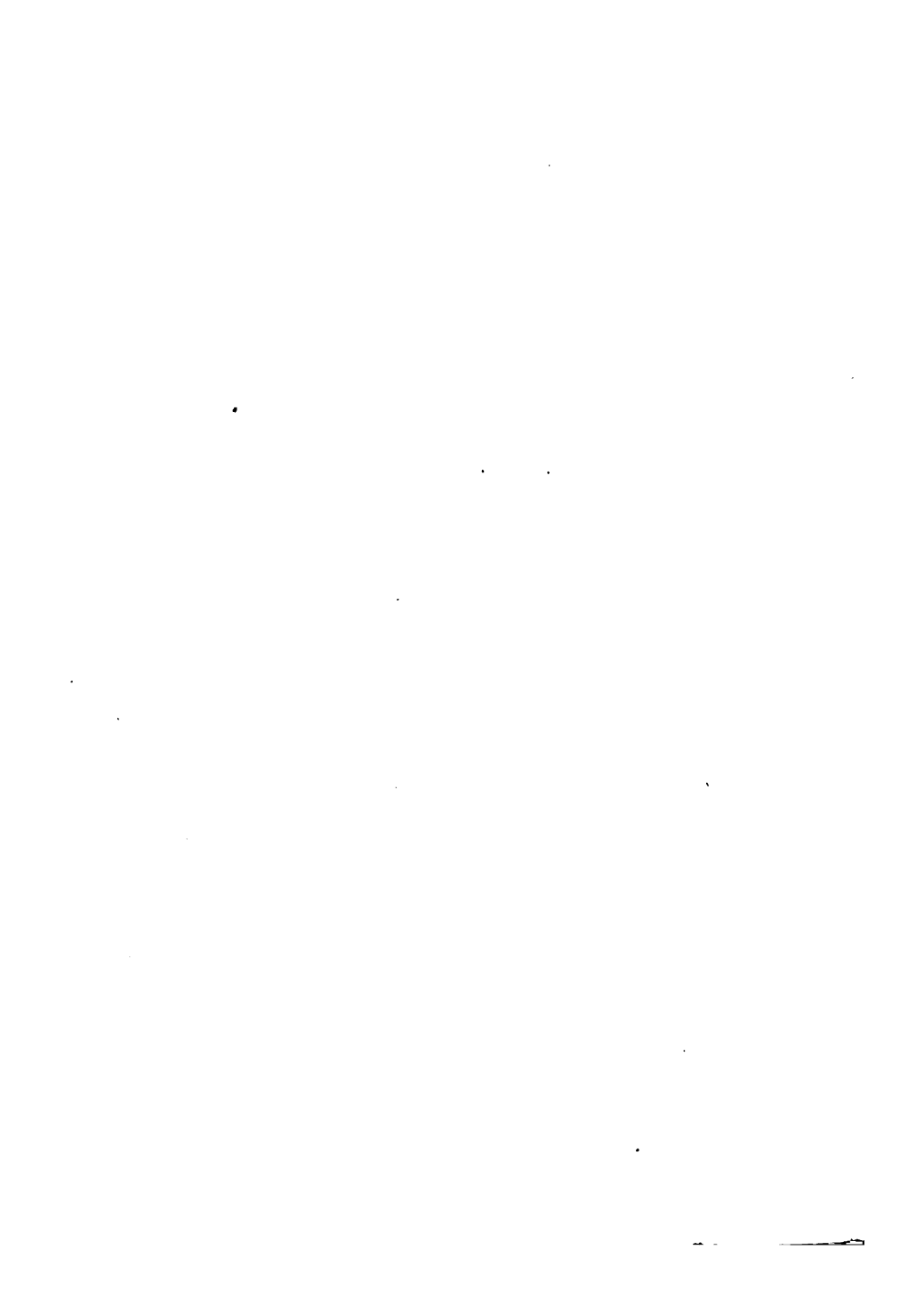


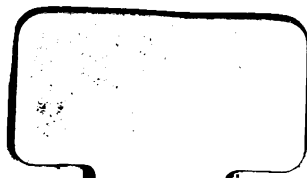












DOROTHY VERNON AND HADDON HALL.

"DOLL:"

A DREAM OF HADDON HALL;

BEING THE STORY OF

DOROTHY VERNON'S WOOING AND FLIGHT,

BY

J. E. MUDDOCK,

Author of "A Wingless Angel," "As the Shadows Fall," "John Jellaby's House-keeper," "The Mystery of Jasper Janin," "Gauze Wings," &c.

This Work contains an exquisite steel engraving of Dorothy Vernon when a girl, copied by express permission from an old oil painting in possession of His Grace the Duke of Rutland.

PUBLISHED BY

JOHN HEYWOOD, London and Manchester.

ORDER THROUGH ANY BOOKSELLER.

PRICE—Paper Cover, ONE SHILLING; Cloth, ONE AND SIXPENCE.

*The romantic story of "Sweet Dorothy's" wooing and elopement with John, afterwards Lord John Manners, is fully and graphically told; and no one should visit the grand old pile of Haddon Hall without reading this little Book.*

#### OPINIONS OF THE PRESS.

"The story of Doll Vernon's wooing and flight and marriage is told very simply and very sweetly by Mr Muddock." *Dundee Courier and Argus.*

"A charming little book. . . . In writing the pretty story Mr Muddock has adopted a quaintness and a simple 'old-fashioned' style of narration which are pleasingly suitable to the history of 'Doll,' or Dorothy, the lovely daughter of Sir George Vernon, who was the famous 'King of the Peak' in the sixteenth century."—*Wellington Journal and Shrewsbury News.*

"This is the title of an interesting little book by Mr J. E. Muddock, relative to the romantic story of sweet Dorothy Vernon, the incidents of which cluster round Haddon Hall like the ivy which clings to its ancient walls. . . . The circumstances are related in a way which keeps up the interest of the reader throughout."—*Buxton Herald.*

"Mr Muddock may without much hesitation be awarded the bays for perhaps the most picturesque and complete version extant of the sweet old love-legend which casts such a tender mimbus of romance around the ruins of Haddon Hall."—*Derbyshire Courier.*